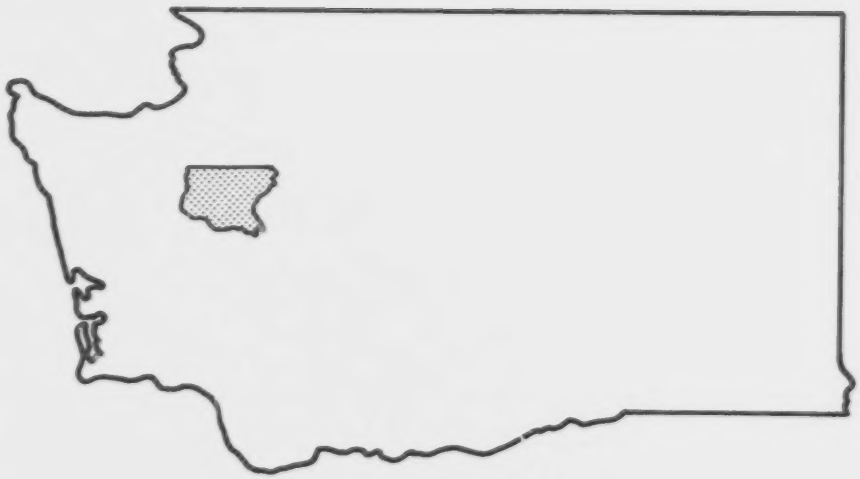
AUG 19 1989

FLOOD INSURANCE STUDY

KING COUNTY, WASHINGTON
AND INCORPORATED AREAS
VOLUME 1 OF 4

COMMUNITY NAME	COMMUNITY NUMBER
AUBURN, CITY OF	530073
BELLEVUE, CITY OF	530074
BLACK DIAMOND, CITY OF	530272
CARNATION, CITY OF	530076
DES MOINES, CITY OF	530077
DUVALL, CITY OF	530282
ENUMCLAW, CITY OF	530318
ISSAQUAH, CITY OF	530079
KENT, CITY OF	530080
KING COUNTY, UNINCORPORATED AREAS	530071
KIRKLAND, CITY OF	530081
LAKE FOREST PARK, CITY OF	530082
NORMANDY PARK, CITY OF	530084
NORTH BEND, CITY OF	530085
PACIFIC, CITY OF	530086
REDMOND, CITY OF	530087
RENTON, CITY OF	530088
SEATTLE, CITY OF	530089
SKYKOMISH, TOWN OF	530236
SNOQUALMIE, CITY OF	530090
TUKWILA, CITY OF	530091



REVISED: SEPTEMBER 29,1989

Federal Emergency Management Agency

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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Flood Insurance Rate Map

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FLOOD INSURANCE STUDY
KING COUNTY WASHINGTON AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the geographic area of King County, Washington, including the Cities of Auburn, Bellevue, Black Diamond, Carnation, Des Moines, Duvall, Enumclaw, Issaquah, Kent, Kirkland, Lake Forest Park, Normandy Park, North Bend, Pacific, Redmond, Renton, Seattle, Snoqualmie, and Tukwila, the Town of Skykomish and the unincorporated areas of King County (hereinafter referred to collectively as King County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

This Flood Insurance Study investigates and/or revises and updates previous Flood Insurance Studies/Flood Insurance Rate Maps for the cities of Auburn, Bellevue, Black Diamond, Carnation, Des Moines, Duvall, Issaquah, Kent, Kirkland, Lake Forest Park, Normandy Park, North Bend, Pacific, Redmond, Renton, Seattle, Snoqualmie, and Tukwila, the Town of Skykomish, and the unincorporated areas of King County. This information will be used by King County and the incorporated communities to update existing floodplain regulations as part of the Regular Phase of the NFIP. The information will also be used by local and regional planners to further promote sound land use and floodplain development.

The City of Bothell and the Town of Milton are bi-county communities. The technical information presented in this Flood Insurance Study for the incorporated portions of these communities is for information only. These communities each have individual effective Flood Insurance Studies.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for the original King County study were performed by the U.S. Army Corps of Engineers (COE), Seattle District, for the Federal Emergency Managemenet Agency (FEMA), under Inter-Agency Agreement No. IAA-H-2-73, Project Order No. 14, and Inter-Agency Agreement No. IAA-H-19-74, Project Order Nos. 1 and 15. This study was completed in August 1976. The Enplan Corporation, Consulting Engineers, Kirkland, Washington, assisted in the transfer of map data from photomosaic and topographic maps to the report work maps for the Seattle District, COE.

The hydrologic and hydraulic analyses for the Tolt River were performed by the U.S. Soil Conservation Service (SCS) for Flood Hazard Analyses, Tolt River, King County, Washington.

Hydrologic and hydraulic analyses for the communities of King County were performed by study contractors and are summarized below.

Community	Contractor	Contract Number	Completion Date
King County (revised study)	CH2M Hill Northwest, Inc., for FEMA	EMW-85-C-1893	June 1987
City of Seattle (revised study)	CH2M Hill Northwest, Inc., for FEMA	EMW-85-C-1893	June 1987
Portion of Upper Green River Valley upstream from Auburn	COE, Seattle District, for FEMA	Inter-Agency Agreement No. IAA-EMW-E-1153 Project Order No. 1	February 1988
City of Auburn (original study)	Tudor Engineering Co., for FEMA	H-4025, Amendment 4	May 1978
City of Auburn (revised study)	CH2M Hill Northwest, Inc., for FEMA	EMW-85-C-1893	June 1987
City of Bellevue	USGS, Water Resources Division for FEMA	Inter-Agency Agreement No. IAA-H-8-76, Project Order No.3	May 1977

Community	Contractor	Contract Number	Completion Date
City of Carnation	CH2M Hill, Inc., for FEMA	H-4600	August 1978
City of Des Moines	CH2M Hill, Inc., for FEMA	H-4600	September 1978
City of Duvall	CH2M Hill, Inc., for FEMA	H-4600	September 1978
City of Issaquah	Tudor Engineering Co. for FEMA	H-4025	September 1977
City of Kent (original study)	Tudor Engineering Co., for FEMA	H-4025 Amendment No. 13	June 1979
City of Kent (revised study)	CH2M Hill Northwest, Inc., for FEMA	EMW-85-C-1893	June 1987
City of Kirkland	Tudor Engineering Co., for FEMA	H-4025	December 197?
City of Lake Forest Park	CH2M Hill, Inc., for FEMA	H-4600	August 1978
City of Normandy Park	CH2M Hill, Inc., for FEMA	H-3815	June 1976
City of North Bend	CH2M Hill, Inc., for FEMA	H-4600	October 1981
City of Pacific	CH2M Hill, Inc., for FEMA	H-4600	April 1979
City of Redmond	Tudor Engineering Co., for FEMA	N/A	August 1977
City of Redmond (additional hydrologic & hydraulic analyses)	COE, Seattle District for FEMA	N/A	August 1976
City of Renton (original study)	Tudor Engineering Co. for FEMA	H-4025	July 1979
City of Renton (revised study)	CH2M Hill, Northwest, Inc., for FEMA	EMW-85-C-1893	June 1987

Community	Contractor	Contract Number	Completion Date
Town of Skykomish	CH2M Hill, Inc. for FEMA	H-4600	July 1979
Town of Snoqualmie	CH2M Hill, Inc. for FEMA (additional data from COE)	H-4810	July 1981
City of Tukwila	Tudor Engineering Co., for FEMA	H-4025, Amendment No. 10	April 1979

1.3 Coordination

The coordination for the original King County Flood Insurance Study was completed in multi-agency conferences managed by the FEMA Consultation and Coordination Officer (CCO). The State of Washington Department of Ecology provided input to establish the study priority and the contracting agency. The King County Division of Hydraulics offered valuable assistance to the COE and the study contractor, in establishing the scope of this study, coordinating basic data and defining approximate floodplain boundaries. Topographic maps at contour intervals of 5 feet, which served as part of the input for the hydraulic analysis and the location of the floodplain boundary lines, were supplied by the King County Department of Public Works. The county also provided information on certain elevation reference marks.

Contacts with the private engineering firms of Bush Roed and Hitchings, Inc., of Seattle, and Horton Dennis and Associates, Inc., of Seattle, were made during the study to discuss field surveys they had conducted.

Permission to enter restricted areas for field surveys was obtained from the City of Seattle and the Chicago, Milwaukee, St. Paul and Pacific Railroad.

The final CCO meeting was held at the offices of the King County Public Works Department on June 25, 1976. King County officials objected to the "equal conveyance" floodways that were developed in accordance with FEMA guidelines, wanting to apply more stringent floodway criteria. They were especially concerned about the Snoqualmie River, fearing that the loss of valley storage would increase peak discharges if the fringe were filled.

The initial coordination meeting for the original City of Auburn study was held on April 8, 1976. At this meeting, streams to be studied by detailed methods were identified by representatives of the community, the study contractor, and FEMA. During the course of the work, numerous informal contacts were made by the study

contractor with the community for the purpose of obtaining data and base maps.

On March 17, 1978, the results of the work were reviewed at an intermediate coordination meeting attended by representatives of the city, the study contractor, and FEMA.

The results of this study were reviewed at a final community coordination meeting held on December 6, 1978. Attending the meeting were representatives of FEMA, the study contractor, and the city. This study incorporates all appropriate comments, and all problems have been resolved.

The initial coordination meeting for the City of Bellevue study was held in April 1975. This meeting was attended by personnel of the U.S. Geological Survey (USGS), FEMA, and officials of the Bellevue Planning and Storm Drainage Utility Departments. Community base maps were selected and streams requiring detailed study were identified.

A search for basic data was made at all levels of government. Topographic maps with a 5-foot contour interval were supplied by the Bellevue city engineer; these served as preliminary work maps on determining the location of floodplain boundary lines. Some locations and elevations of bench marks were provided by the City and verified by USGS levels.

During the course of the work by the USGS, flood elevations, floodplain boundaries, and floodway delineations were reviewed with community officials. On April 29, 1977, the results of the work by the USGS were reviewed at a final CCO meeting attended by personnel of the USGS, FEMA, and officials of the Bellevue Planning and Storm Drainage Utility Departments.

The initial coordination meeting for the City of Carnation was held in the Carnation Town Hall on July 29, 1977, At the meeting, flooding sources for the City of Carnation were defined and the areas to be studied were identified. Representatives from the City of Carnation, CH2M HILL, Inc. (the study contractor), and FEMA attended the meeting.

Throughout the study, coordination was maintained with the COE, King County hydraulics division, town officials, Sammamish Valley newspaper, Carnation Planning Commission, and King County Planning Commission. All were contacted to provide information pertinent to this Flood Insurance Study.

The results of this study were reviewed at a final community coordination meeting held on De mber 19, 1978. Attending the meeting were representatives of FEMA, the study contractor, and the city. No problems were raised at the meeting.

The initial coordination meeting for the City of Des Moines was held on August 19, 1977. This meeting was attended by

representatives of the study contractor, FEMA, and the city. This meeting was held to identify areas requiring detailed study and to familiarize city officials with all aspects of the study and to solicit pertinent information.

The Des Moines city government; the Covenant Beach Bible Camp management; and King County Department of Public Works, Division of Hydraulics, were contracted for the coordination of this Flood Insurance Study.

The results of this study were reviewed at a final community coordination meeting held on March 26, 1979. Attending the meeting were representatives of FEMA, the study contractor, and the city. No problems were raised at the meeting.

In 1981, the City of Des Moines annexed an area along Puget Sound south of the Des Moines Marina. A detailed wave runup analysis of this area was completed in May 1984. An area west of Pacific Highway South (State Highway 99) between Kent-Des Moines Road and South 252nd Street has also been annexed by the City. The analysis to determine the extent of approximate floodplain boundaries in this area was completed in January 1985 and used to update this study.

The initial coordination meeting for the City of Duvall was held in the Duvall City Hall on July 28, 1977. At the meeting, flooding sources for the City of Duvall were defined and the areas to be studied were identified. Representatives from the City of Duvall, the study contractor, and FEMA attended the meeting.

The King County Department of Public Works, Division of Hydraulics; the Sammamish Valley News; and the Duvall Planning Commission were contracted for information pertinent to this Flood Insurance Study.

The results of this study were reviewed at a final community coordination meeting held on October 2, 1978. Attending the meeting were representatives of FEMA, the study contractor, and the city. No problems were raised at the meeting.

The initial coordination meeting for the City of Issaquah was held on April 8, 1976. The identification of streams selected for detailed analysis was accomplished at this meeting which was attended by representatives of the community, the State of Washington Department of Ecology, FEMA, and a study contractor who was initially chosen to perform the study but did not finally participate.

During the course of the work numerous informal contacts were made by Tudor Engineering Company personnel with the community for the purpose of obtaining information and confirming data. Previous work by the COE was reviewed and forms the basis of this study.

On January 27, 1977, the results of the work were reviewed at an intermediate coordination meeting attended by representatives of

the City of Issaquah, Tudor Engineering Company, and FEMA. A final coordination meeting held on April 2, 1979, resulted in agreement by the same parties, and this report incorporates resolution of all comments received as a result of coordination activities.

The initial coordination meeting for the original City of Kent study was held on April 8, 1976. Streams to be studied by detailed methods were identified at this meeting, which was attended by representatives of the City of Kent and FEMA.

During the course of work, the study contractor maintained contact with the COE; the King County Division of Hydraulics; and the City of Kent, Department of Public Works.

On May 29, 1979, the results of the study were reviewed at an intermediate coordination meeting attended by representatives of the City of Kent, the study contractor, and FEMA.

The results of this study were reviewed at a final community coordination meeting held on April 28, 1980. Attending the meeting were representatives of FEMA, the study contractor, and the city. No problems were raised at the meeting.

On April 8, 1976, the initial coordination meeting for the City of Kirkland was held to determine streams to be studied by detailed analysis. This meeting was attended by representatives of the city, FEMA, and the study contractor who was originally chosen to perform the work but did who not finally participate.

During the course of the work, numerous informal contacts were made by the study contractor with the community for the purpose of obtaining data and base maps.

On November 30, 1977, the results of the work were reviewed at an intermediate coordination meeting attended by representatives of the City of Kirkland, the study contractor, and FEMA.

The results of this study were reviewed at a final community coordination meeting held on May 12, 1980. Attending the meeting were representatives of FEMA, the study contractor, and the City. This study incorporates all appropriate comments, and all problems have been resolved.

In August 1977, the initial coordination meeting for the City of Lake Forest Park was held. Streams requiring detailed and approximate study were identified at this meeting attended by representatives of the study contractor, FEMA, and the City of Lake Forest Park.

Initial contact with the Lake Forest Park City Manager, who is also the Public Works Director, was made in February 1978. The City Manager provided background data in the community and descriptions of flood hazard areas in Lake Forest Park. The King County Public

Works Department and the USGS were contacted to provide information pertinent to this Flood Insurance Study for Lake Forest Park.

The results of this study were reviewed at a final community coordination meeting held on December 12, 1978. Attending the meeting were representatives of FEMA and the study contractor, as well as city officials and interested citizens. No problems were raised at the meeting.

The initial coordination meeting for the City of Normandy Park was held on December 5, 1975. It was attended by representatives of the study contractor, FEMA, and officials of Normandy Park. This meeting was held to identify streams requiring detailed study, to familiarize city officials with all aspects of the study, and to solicit pertinent information.

A search for basic data was made at all levels of government. The City of Normandy Park, the King County Zoning and Plans Division, the King County Hydraulics Commission and CH2M HILL, Inc. provided maps and other data used in this study.

On August 6, 1976, the results of the work effort by CH2M HILL Inc., were reviewed at the final CCO meeting attended by personnel of the study contractor, FEMA, and officials of the City of Normandy Park. The comments of the officials were incorporated and the study accepted.

The initial coordination meeting for the City of North Bend was held on July 29, 1977. Streams requiring detailed study were identified at this meeting attended by representatives of the study contractor, FEMA, the State of Washington Department of Ecology, King County, and the City of North Bend.

In March 1981, an approximate study was added to the scope of study as a result of consultation among representatives of FEMA, the City of North Bend, and the study contractor.

The King County Engineering and Public Works Departments were contacted to discuss past flooding problems and to gather available topographic mapping and levee plans along with aerial photographs of recent flooding events. The COE was also contacted to obtain recently developed hydrologic and hydraulic information pertinent to this Flood Insurance Study. The hydrology presented in this study was coordinated with COE, the State of Washington Department of Ecology, and the King County Department of Public Works.

On September 22, 1981, the results of the study were reviewed at an intermediate coordination meeting attended by representative of the city, the State of Washington Department of Ecology, FEMA, and the study contractor. No problems were raised at the meeting.

The final coordination meeting was held on September 13, 1982, and was attended by representatives of FEMA, the study contractor, and the city. No problems were raised at the meeting.

The initial coordination meeting for the City of Pacific was held on August 1, 1977. Rivers and drainage ditches requiring detailed and approximate study were identified at this meeting attended by representatives of FEMA, the city, and the study contractor.

The COE, the USGS, the Washington State Department of Highways, Tudor Engineering, city officials, and local citizens provided information used in the report.

The results of the study were reviewed at a final community coordination meeting held on December 3, 1979. Attending the meeting were representatives of FEMA, the study contractor, and the Pacific City Council and members of the public. As a result of this meeting, an area of moderate flood hazard was added to the map.

An initial coordination meeting for the City of Redmond was held to identify streams requiring detailed study. This meeting was attended by representatives of the City of Redmond, FEMA, and the study contractor. Results of the hydrologic analyses were coordinated with the City of Redmond, FEMA, and Tudor Engineering Company.

During the course of the work, numerous informal contacts were made by Tudor Engineering Company, which conducted the study, with community officials for the purpose of obtaining information and confirming data. Previous work by the COE was reviewed and forms the basis of this study.

The results of the study were reviewed at the final meeting attended by representatives of the study contractor, FEMA, and community officials. The study was acceptable to the community.

The initial coordination meeting for the original City of Renton study was held on April 8, 1976. Streams selected for detailed analysis were identified at this meeting attended by representatives of the community, the original study contractor, and FEMA.

On July 13, 1979, the results of the work were reviewed at an intermediate coordination meeting attended by representatives of the City, the study contractor, and FEMA.

The results of this study were reviewed at a final community coordination meeting held on May 5, 1980. Attending the meeting were representatives of FEMA, the study contractor, and the city. No problems were raised at meeting.

The initial coordination meeting for the Town of Skykomish was held on July 29, 1977. Streams requiring detailed and approximate study were identified at this meeting attended by representatives of the study contractor, FEMA, and the Town of Skykomish. Town officials

provided background data on the community and descriptions of known flood hazard areas in Skykomish.

The King County Public Works Department, the COE, and the USGS were contacted for additional information to this Flood Insurance Study.

The results of this study were reviewed at a final community coordination meeting held on April 21, 1980. Attending the meeting were representatives of FEMA, the study contractor, and the town. This study incorporates all appropriate comments, and all problems have been resolved.

The initial coordination meeting for the City of Snoqualmie was held on May 31, 1978. Streams requiring detailed study were identified at this meeting attended by representatives of the study contractor, FEMA, the COE, and the City of Snoqualmie. A series of meetings was also attended by the city officials, FEMA, and study contractor representatives to discuss possible floodway alternatives. These meetings were held in March 1979, January 1981, and June 1981, and initially resulted in the selection of an equal conveyance floodway for the study. The requirement for expansion of the study to include additional detailed and approximate study mapping for and expected annexation to the city was discussed at the intermediate community coordination meeting held November 4, 1981, and attended by representatives of the study contractor, FEMA, and the City of Snoqualmie.

At the final community coordination meeting held on August 1, 1983, city officials requested that an alternative negotiated floodway be considered that would more fully meet the City's needs along with those of the adjacent county jurisdiction and ownerships. A negotiated floodway was developed for and approved by the City, King County, and affected county ownerships by written correspondence received during the period from October 1983 to January 1984.

Results of the hydrologic analyses were coordinated with the COE, the State of Washington Department of Ecology, and the King County Department of Public Works.

The initial coordination meeting for the City of Tukwila was held on April 8, 1976. Streams selected for detailed analysis were identified at this meeting attended by representatives of the community and FEMA.

During the course of the work, numerous informal contacts were made by the study contractor with the community in order to obtain data and base maps. Data were also obtained from the COE.

On March 26, 1979, the results of the work were reviewed at an intermediate coordination meeting attended by representatives of the City, the study contractor, and FEMA.

The results of this study were reviewed at a final community coordination meeting held on December 10, 1979. Attending the meeting were representatives of FEMA, the study contractor, and the city. No problems were raised at the meeting.

Initial community coordination meetings for the revised study for King County, Washington, and the Cities of Auburn, Kent, Renton, and Seattle, all within King County, were held on January 16, 1985, and January 24, 1985. At the January 16, 1985, meeting, representatives of FEMA, King County, the Cities of Auburn, Kent and Renton, the Washington Department of Ecology, and the study contractor, CH2M HILL, Inc., identified streams requiring detailed and approximate study. Representatives of FEMA, the City of Seattle, and CH2M HILL, Inc., identified streams requiring detailed and approximate study at a meeting held on January 24, 1985. The purposes of the meetings were: (1) to inform the county on its status in the NFIP; (2) to identify existing flooding problems and available pertinent data on flooding in the county and cities, and (3) to reach an agreement on the areas to be studied.

During the course of the study, numerous contacts were made and meetings held with local agencies and community officials to discuss and gather available data on flooding history, methods and preliminary results of analyses, and status of proposed near-term drainage system improvements for those flooding sources under study. The USGS was contacted and requested to provide available flow data and data analyses for the streams being studied and surrounding regional drainages. The COE and the SCS were also contacted and asked to provide any data or studies they had that were relevant to flooding caused by the streams under study.

Correspondence with the Washington State Department of Transportation (WSDOT) pertained to proposed plans and timing of drainage structure improvements for Rolling Hills Creek and Springbrook Creek under Interstate Highway 405 (City of Renton). Information was also requested for drainage improvements to State Route 522 and NE 195th Street, at their crossings of Little Bear Creek.

The initial meeting was held with King County personnel to request available hydrologic and hydraulic information and accounts of flooding history for the flooding sources under study on December 5, 1985. King County Surface Water Management Division staff were contacted and asked to provide basin planning studies and information on any near-term planned drainage system improvements for the flooding sources under study. Design drawings for two bridges being constructed as part of Soos Creek Park on Big Soos Creek were made available through contacts with the King County Division of Parks and Recreation. The Surface Water Division's maintenance personnel were asked to provide information on the operation of the P1 pumping station on the Black River, and on the flooding history of the streams being studied.

Storage floodway concepts for local drainages in the Green River Valley, including Mill Creek (Auburn), were discussed at meetings attended by representatives of King County, the Cities of Auburn and Kent, FEMA, and the study contractor, CH2M HILL, Inc.

Preliminary results of analyses for the Green River and levee freeboard issues were presented and discussed at a public meeting on September 11, 1986, attended by representatives from King County, the City of Auburn, the City of Kent, FEMA, and CH2M HILL, Inc.

City of Kent personnel were asked to provide data for a recent drainage basin study prepared for Mill Creek (Kent). Information on proposed drainage improvements for flooding sources under study in the Cities of Auburn, Kent, Renton, and Seattle were requested in the initial stages of study.

Results of the hydrologic analyses were coordinated with community officials, the COE, the SCS, and the USGS.

In March 1987, a coordination meeting for representatives of the COE, Seattle District, and FEMA was held. An analysis of an upper reach of the Green River, immediately above the reach studied in the 1987 King County restudy, was identified. This study was performed under FEMA's Limited Map Maintenance Program.

The final community coordination meetings were held on December 6 and 7, 1988, and were attended by representatives of FEMA, the COE, and the county. The study was acceptable to the county.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the geographic area of King County, Washington. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through 1992.

The following streams were studied by detailed methods in the revised study:

Raging River	-	From Interstate Highway 90 to 0.3 mile upstream of the second Upper Preston Road bridge
Green River	-	From approximately 0.3 mile downstream of Pacific Highway to confluence with Big Soos Creek

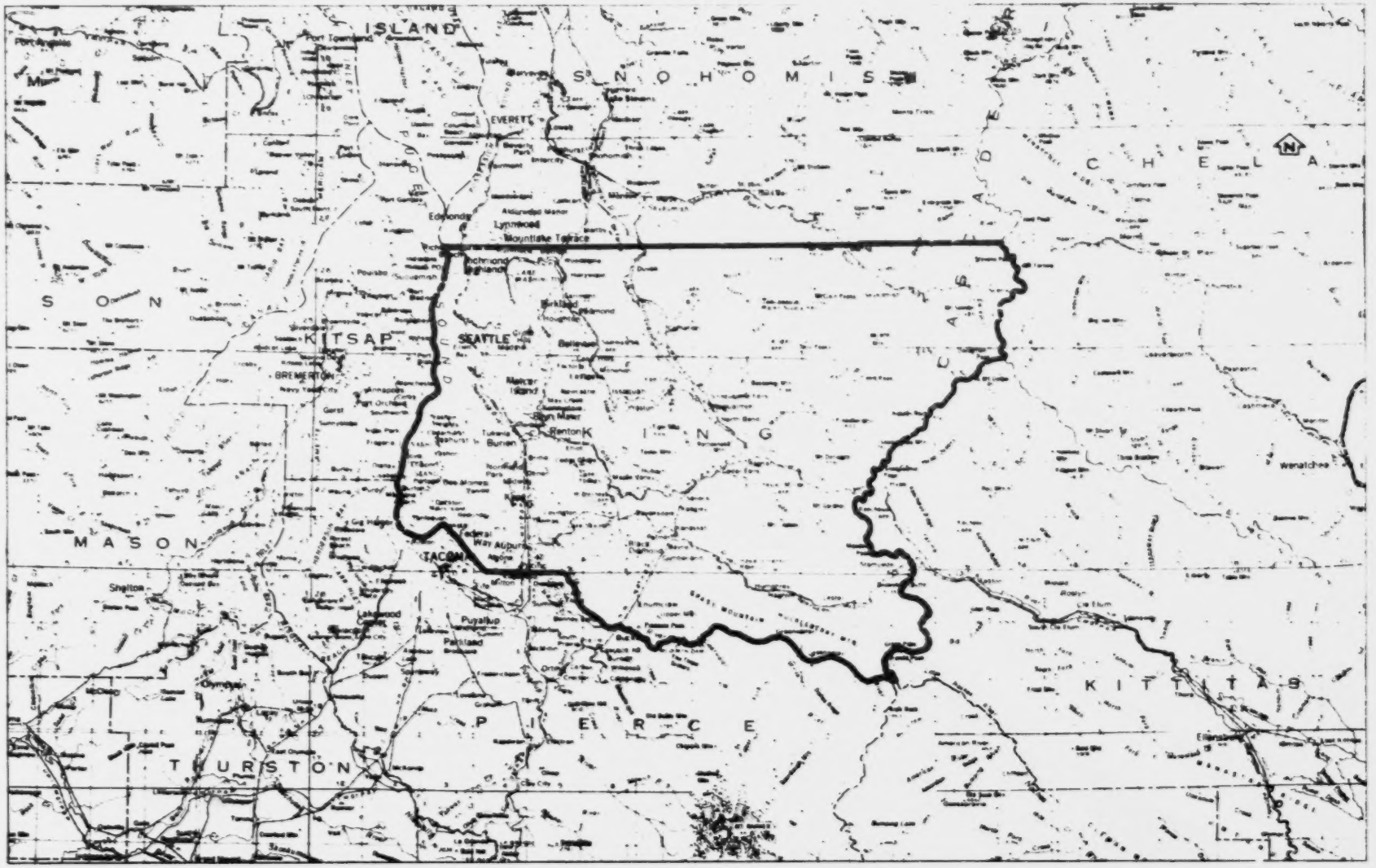

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
(AND INCORPORATED AREAS)

APPROXIMATE SCALE

16 0 16 32 48 MILES

VICINITY MAP

Black River/ Springbrook Creek	-	From confluence with Green River to SW 16th Street
Mill Creek (Auburn)	-	From confluence with Green River to Highway 18 bridges at RM 6.2
Mill Creek (Kent)	-	From Highway 167 to limit of previous detailed study at the Earthworks Park stormwater detention facility outlet
Big Soos Creek	-	From confluence with Covington Creek to SE 176th Street
Swamp Creek	-	From confluence with Sammamish River to northern King County boundary
Little Bear Creek	-	From confluence with Sammamish River to northern King County boundary
Bear/Evans Creek	-	From limit of previous detailed study at confluence with Cottage Creek to Paradise Lake
Issaquah/Holder Creek	-	From limit of previous detailed study at SE May Valley Road to Highway 18
West Fork Issaquah Creek	-	From confluence with Issaquah Creek to SE 128th Way
May Creek	-	From Coal Creek Parkway bridge to SE 109 Place
May Creek Tributary	-	From confluence with May Creek to 188th Avenue SE
Cedar River	-	From Lake Washington to approximately RM 2.1
North and South Forks of Thornoton Creek	-	From confluence with Lake Washington to Interstate Highway 5
Longfellow Creek	-	From SW Brandon Street to SW Thistle Street
Rolling Hills Creek	-	Between first and second crossings of Interstate Highway 405

The Upper Green River was studied by detailed methods in the COE February 1988 study from its confluence with Big Soos Creek to Flaming Geyser Bridge.

The Tolt River was studied by detailed methods in the SCS June 1982 study from approximately 6,300 feet upstream of the Chicago Milwaukee, St. Paul & Pacific Railroad to approximately 5.5 miles upstream of the Railroad, a reach of approximately 4.3 miles.

The following streams studied by detailed methods were taken directly from previous Flood Insurance Studies covering King County and incorporated areas (References 1 to 18).

Snoqualmie River - From the Snohomish County line to the confluence with Middle Fork Snoqualmie River, a reach of approximately 45 miles

Middle Fork Snoqualmie River - From a point approximately 2,323 feet downstream of SE 428th Avenue to a point approximately 2,323 feet upstream of Mount Si Road, a reach of approximately 3.37 miles

North Fork Snoqualmie River - From confluence with Snoqualmie River to a point approximately 5,914 feet upstream of 428th Avenue SE, a reach of approximately 1.5 miles

South Fork Snoqualmie River - From confluence with Snoqualmie River to a point approximately 8,000 feet downstream of 436th Avenue SE, a reach of approximately 3.8 miles. (Note: A portion of South Fork Snoqualmie River just upstream of the above-referenced detailed study reach is now depicted as approximate 100-year flooding. This change was made because updated analysis along that reach superceded the detailed analysis and elevations shown on the effective county map (Reference 1).

Green River - From its mouth to confluence with Black River and from Flaming Geyser Bridge to a point approximately 7,286 feet upstream of Whitney Road

Springbrook Creek - From SW 16th Street to a point approximately 1,690 feet upstream of South 228th Street, a reach of approximately 6.32 miles

Mill Creek (Auburn)	-	From State Highway 18 to a point approximately 845 feet upstream of 15th Street SW, a reach of approximately 0.72 miles
Mill Creek (Kent)	-	From its mouth to State Highway 167, a reach of approximately 4.24 miles
White River	-	From a point approximately 4,330 feet downstream of Burlington Northern Railroad to the Muckleshoot Indian Reservation, a reach of approximately 3.38 miles
White River (Left Bank Overflow)	-	From confluence with White River to the Muckleshoot Indian Reservation, a reach of approximately 0.70 mile
Sammamish River	-	From its mouth at Lake Washington to the mouth of Lake Sammamish, a reach of approximately 15.3 miles
North Creek	-	From its mouth to a point approximately 10 feet upstream of NE 205th Street at the corporate limits of Bothell, a reach of approximately 1.45 miles
Bear Creek	-	From confluence with Sammamish River to confluence with Cottage Lake Creek, a reach of approximately 5.35 miles
Evans Creek	-	From confluence with Bear Creek to a point approximately 2,059 feet upstream of 220th Avenue NE, a reach of approximately 4.66 miles
Issaquah Creek	-	From its mouth at Lake Sammamish to Southeast May Valley Road, a reach of approximately 8.0 miles
North Fork Issaquah Creek	-	From confluence with Issaquah Creek to a point approximately 740 feet upstream of Issaquah Avenue North, a reach of approximately 0.95 mile
East Fork Issaquah Creek	-	From confluence with Issaquah Creek to a point approximately 1,711 feet upstream of 3rd Avenue NE, a reach of approximately 0.87 mile

Tibbetts Creek	-	From its mouth to a point approximately 4,610 feet upstream of State Highway 900, a reach of approximately 2.3 miles
May Creek	-	From Barbee Mill Road to a point approximately 2,535 feet upstream of NE 31st Street, a reach of approx-imately 2.02 miles
Vasa Creek	-	From the corporate limits of the City of Bellevue approximately 2,500 feet upstream from its mouth to a point approximately 225 feet upstream
Cedar River	-	From a point approximately 2,629 feet upstream of Interstate Highway 405 to a point approximately 7,920 feet upstream of the Chicago, Milwaukee, St. Paul and Pacific Railroad, a reach of approximately 19 miles
Mercer Creek	-	From its mouth to the confluence of Kelsey Creek and Richards Creek, a reach of approximately 12.9 miles
Mercer Creek Right Channel	-	Its entire length, a reach of approximately 1.0 mile
Richards Creek	-	From confluence with Mercer Creek to a point approximately 380 feet upstream of SE Allen Road, a reach of approximately 2.65 miles
Richards Creek West Tributary	-	From confluence with Richards Creek to a point approximately 310 feet upstream of SE 32nd Street, a reach of approximately 3.22 miles
Richards Creek East Tributary	-	From confluence with Richards Creek to a point approximately 680 feet upstream of SE 26th Street, a reach of approximately 0.24 miles
Kelsey Creek	-	From its mouth to a point approx-imately 760 feet upstream of SE 16th Street, a reach of approximately 5.08 miles

West Tributary Kelsey Creek	-	From confluence with Kelsey Creek to Redmond Bellevue Road, a reach of approximately 1.57 miles
East Branch of West Tributary Kelsey Creek	-	From confluence with West Tributary Kelsey Creek to a point approximately 842 feet upstream of 137th Avenue NE, a reach of approximately 0.44 miles
North Branch Mercer Creek (North Valley)	-	From confluence with Kelsey Creek to a point approximately 4,862 feet upstream of NE 24th Street, a reach of approximately 1.49 miles
McAleer Creek	-	From a point approximately 40 feet upstream of Bothell Way NE to a point approximately 3,340 feet upstream of NE 185th Street, a reach of approximately 2.13 miles
Coal Creek	-	From its mouth to the City of Bellevue corporate limits at Interstate Highway 405 and from the City of Bellevue corporate limits 8,250 feet upstream of Interstate Highway 405 to a point 9,690 feet upstream of Interstate Highway 405, a total length of approximately 0.95 miles
Forbes Creek	-	From the City of Kirkland corporate limits approximately 1,420 feet upstream from its mouth to a point approximately 496 feet upstream of NE 108th Street, a reach of approximately 5.66 miles
Lyon Creek	-	From confluence with Lake Washington to 35th Avenue NE and from a point approximately 80 feet downstream of Ballinger Road to a point approximately 760 feet upstream of Ballinger Road, a total distance of approximately 1.42 miles
Yarrow Creek	-	From 116th Avenue NE to a point approximately 1,515 feet upstream of NE 34th Street, a reach of approximately 0.36 mile

Meydenbauer Creek	-	From its mouth to a point approximately 520 feet upstream of 102nd Avenue SE, a reach of approximately 0.36 mile
North Fork Mendenbauer Creek	-	From confluence with Meydenbauer Creek to a point approximately 830 feet upstream
South Fork Skykomish River	-	From a point approximately 1,505 feet downstream of 5th Street to a point approximately 2,693 feet upstream of 5th Street, a reach of approximately 0.8 mile
Maloney Creek	-	From a point approximately 100 feet downstream of Burlington Northern Railroad to a point approximately 890 feet upstream of NE Old Cascade Highway, a reach of approximately 0.32 mile
Miller Creek	-	From its mouth to a point approximately 2,530 feet upstream of 12th Avenue SW, a reach of approximately 0.86 mile
Walker Creek	-	From confluence with Miller Creek to a point approximately 600 feet upstream of 12th Avenue SW, a reach of approximately 0.33 mile
Des Moines Creek	-	From its mouth at Puget Sound to a point approximately 1,960 feet upstream
Unnamed Drainageway	-	The ponding of an unnamed drainageway in the central business district in the City of Kirkland, between Central Way and Kirkland Way

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the community.

2.2 Community Description

King County, located in western Washington, is the largest center of population and economic growth in the State of Washington. Its eastern boundary is along the divide of the rugged Cascade Range, and is bordered on the west by Puget Sound. Contiguous counties related economically, as well as geographically, to King County are Kitsap County to the west, Chelan and Kititas Counties to the east, Snohomish County to the north, and Pierce County to the south.

Seattle is the county seat and largest city in Washington. It is located between Puget Sound and Lake Washington. Seattle is important as a port for foreign trade with Asian and South American countries as well as for domestic shipping with Alaska. The 1986 estimated population of Seattle was 488,200 (Reference 19). The area within the Seattle corporate limits is currently 91.6 square miles.

Auburn is located south of Kent. It is approximately 5 miles from the shores of Puget Sound and 24 miles south of Seattle. Auburn is bordered by Pierce County to the south and by the Cities of Algona and Pacific to the southwest. Auburn has a community area of approximately 20 square miles, and had a population of 29,950 in 1986 (Reference 19).

The City of Bellevue is located in northwest-central King County, 8 miles east of Seattle. Bellevue, Washington's fourth largest city, had a population of 73,903 in 1980 (Reference 20).

The City of Black Diamond is located in south-central King County. The city had a population of 1,170 in 1980 (Reference 20).

The City of Carnation, incorporated in 1912, is located in north-central King County, on the east bank of the Snoqualmie River. It is approximately 20 miles east of Seattle. Carnation had a population of 913 in 1980 (Reference 20).

The City of Des Moines, incorporated in 1959, is located in west-central King County. It is just south of the City of Normandy Park and southwest of the Seattle-Tacoma Airport. It is situated in one of the few areas in southern King County along Puget Sound where the land slopes gently down toward the water. According to City of Des Moines personnel, the 1988 population was 14,120.

The City of Duvall, incorporated in 1913, is located on State Highway 203, on the east bank of the Snoqualmie River, in northwestern King County. It is approximately 3.0 miles from the Snohomish County line and 7.0 miles north of Carnation. The city had a population of 729 in 1980 (Reference 20).

The City of Enumclaw is located in south-central King County, near the Pierce County line. Enumclaw had a population of 5,427 in 1980 (Reference 20).

The City of Issaquah is located in west-central King County, approximately 14 miles east of downtown Seattle. The city had a population of 5,536 in 1980 (Reference 20).

The City of Kent is located south of Renton and is within 2 to 5 miles of the shores of Puget Sound. The City of Tukwila is northwest of Kent and the City of Des Moines is to the west. Kent had a population of 28,620 in 1986 (Reference 19) and occupies an area of approximately 17 square miles. Most of Kent lies on the 2-mile-wide low-lying valley east of the Green River. The bluff area along the east boundary of Kent is drained by several creeks, including Mill, Springbrook, and Garrison Creeks.

The City of Kirkland is located approximately 5.0 miles northeast of downtown Seattle, in northwestern King County. Kirkland had a population of 18,779 in 1980 (Reference 20).

The City of Lake Forest Park is located in the Puget Sound region of northwest Washington in northwestern King County. The community is part of the suburban area that surrounds the Seattle metropolitan center. Lake Forest Park had a population of 2,485 in 1980 (Reference 20).

The City of Normandy Park is located on Puget Sound in southwestern King County. It is located west of the Seattle-Tacoma Airport and due south of Burien Lake. Normandy Park had a population of 4,268 in 1980 (Reference 20).

The City of North Bend is located in central King County. It lies in the foothills of the Cascade Mountains, approximately 25 miles east of Seattle along Interstate Highway 90. The City of North Bend had a population of 1,701 in 1980 (Reference 20).

The City of Pacific is located in southwestern King County. It shares common boundaries with the City of Algona to the north and Pierce County to the south. The City of Pacific had a population of 2,261 in 1980 (Reference 20).

The City of Redmond lies in northwest-central King County. It is approximately 10 miles northeast of downtown Seattle. Redmond had a population of 23,318 in 1980 (Reference 20).

The City of Renton is located in western King County. It is located approximately 11 miles southeast of Seattle just north of Kent and just east of Tukwila. Renton had a population of 34,460 in 1986 (Reference 19).

The Town of Skykomish is located in northwestern King County. It is in a narrow valley along the south side of the South Fork Skykomish River and is surrounded by the Snoqualmie National Forest. Skykomish had a population of 209 in 1980 (Reference 20).

The City of Snoqualmie is located in central King County. The city lies near the foothills of the Cascade Mountains, approximately 25

miles east of Seattle along Interstate Highway 90. Snoqualmie had a population of 1,370 in 1980 (Reference 20).

The City of Tukwila is located in west-central King County. It is northwest of Kent and west of Renton. It is approximately 12 miles south of Seattle and 22 miles northwest of Tacoma. Tukwila had a population of 3,578 in 1980 (Reference 20).

The population of King County was 1,361,700 as of April 1986, with 561,183 residing in the unincorporated areas, mostly surrounding the large population center of Seattle. In most suburban communities and unincorporated areas of west-central King County, a decline in farming and significant transition to residential and industrial/commercial development has occurred. Urbanization has spread up the Green and Cedar River valleys where urban build up now covers more than one fourth of the basin's land areas. The Sammamish River valley is another site for increased residential and industrial/commercial uses. The Snoqualmie River valley is presently the county's primary district for farming and the dairy industry, but urbanization pressures exist for conversion of those agricultural lands to higher value, more intensive land use.

The climate of King County is predominately a mid-latitude, west coast, marine type. Most of the air masses that reach the Puget Sound area originate over the Pacific Ocean. In late fall and winter these masses are moist and about the same temperature as the ocean surface. Orographic effects caused by lifting and cooling of air masses moving inland result in a wide range of precipitation patterns over King County. Fifty percent of the annual precipitation typically occurs in the 4-month period of October through January, and 75 percent occurs in the 6 months from October through March. Below 1,500 feet in elevation, the winter precipitation normally falls as rain, occasionally interrupted by periods of snow. During the warmest summer months, the average afternoon temperatures over the county's Puget Sound lowlands are in the lower 70s, decreasing into the 60s in the mountains. Temperatures reach 85°F to 90°F about 5 to 15 days per year, and extremes up to 100°F have occurred in the lower valleys. In winter, afternoon temperatures over the lowlands typically range from 35°F to 45°F. The Japanese Current generally moderates the temperatures of winter, but almost every winter there are a few nights when the temperatures range from 10°F to 20°F, with extremes to 0°F.

All of the watersheds in King County are free from glaciers, unlike many streams in other counties lying between the Cascades and Puget Sound.

The undisturbed land cover in King County is dominated by dense conifer forests, with some grass covered prairie-like areas in the lowlands. However, those lowland areas are interspersed with scattered stands of Douglas fir and Oregon white oak. Scotchbroom, and other shrubs and seasonal groundcover are typical of those areas. Fresh water marshes commonly have cover consisting of

cattails, rushes, and sedges. Big leaf maple trees and red alder are very common between the foothills and Puget Sound.

2.3 Principal Flood Problems

Climatic and topographic conditions of the upper Snoqualmie Valley create two distinct high-flow periods each year. In the spring or early summer, the seasonal rise in temperature melts snow in the headwaters and causes increased flow. The other high-flow period, the winter flood, is the most damaging. Winter storms bring in moisture-laden air from the Pacific Ocean and mild temperatures causing snowmelt, combined to cause floods of high magnitude and short duration. Most of the major floods have occurred during November, December, January, and February.

Without the protection by flood control reservoirs, the communities along the free flowing Snoqualmie River and its forks are vulnerable to severe flooding such as occurred in November 1959 and December 1975. The largest known flood in the Snoqualmie-North Bend area occurred on November 23, 1959. As the rivers in the basin swelled on that November day, there occurred a classic example of how wildly a river can change its course. About 9 miles east of the City of North Bend, the South Fork cut a new channel on the opposite side of its valley through what was a section of the main cross state arterial, the Snoqualmie Pass Highway. Atop its newly cut southerly bank, described as a steep clay cliff, remained the former river bed. The torrent on the South Fork left countless homes damaged in North Bend and contiguous areas.

The violent turbulence of the Middle Fork washed out principal bridges and left other spans badly damaged. This misfortune left over 50 families stranded for over a week. Some residents on necessary business, some school children, and carriers of mail and milk treaded lightly by foot across the listing bridges that continued to slip on their supports after the flood.

In the City of Snoqualmie, muddy water swept through many homes leaving a trail of destruction. A portion of a city street sank, developing a large cavity as water collected without a natural outlet. Truckloads of concrete slabs and 58 loads of gravel were dumped into the cavity during the flood to save the road, and to prevent adjacent buildings from being swept away. For the entire night of the flood there was no electrical power in the City of Snoqualmie. This flood had a discharge at the USGS gage near the City of Snoqualmie of 61,000 cubic feet per second (cfs). This discharge is equivalent to a 25-year flood at this point (Reference 21).

The largest known flood in the Carnation area occurred in December 1975. Agriculture and transportation damages constituted the principal losses. However, the lower valley is inundated to some extent almost every winter. Other major floods occurred in February 1932, December 1967, and January 1969.

Storms which cause flooding in the Tolt River Watershed are usually asociated with long, steady rains (i.e., winter maritime occluded frontal systems) which are typified by longer duration, more uniform intensity, and more evenly distributed precipitation than the unstable shower (convective) storms. With this type of rainstorm, the flooding in one basin, such as the Tolt, will be associated with flooding on adjacent basins; thus, the rare occurrence of a 100-year frequency flood on the Tolt would most likely be associated with high water backwater of the Snoqualmie River.

The elevation of future floods depends upon the level of the Snoqualmie River at the peak discharge of the Tolt River, the amount of landfill or diking, the physical arrangement or layout, and the hydraulic conditions of the channel.

High water marks were provided by landowners and field estimates of survey crews. There are no precipitation gages with long records in the watershed, but the Seattle Water Department has 8 storage gages established in 1962-67. The average annual precipiation at these locations ranges from 90 inches (228.6 cm) to 157 inches (398.8 cm).

The largest historical flood since 1953 on the Tolt River near Carnation occurred in 1959 with a peak discharge of 17,400 cfs.

The Raging River is characterized by a relatively steep gradient resulting in high-velocity floodflows and significant bank erosion and channel aggradation problems. These characteristics have lead to increased flood levels, based on local resident accounts, most likely caused by reduction in channel floodflow conveyance capacity with aggradation. In past floods, large boulders, logs, and debris have been swiftly transported down the river and have partially blocked bridges and threatened the levee systems in the Fall City area.

The peak recorded published flow at the USGS gage near Fall City during 40 years of gage operation through 1985 is 3,960 cfs. This occurred on January 24, 1984, and was approximately a 35-year event. Although final estimates of peak flows for a recent event on November 24, 1986, are not available, provisional estimates between 4,400 and 5,300 cfs have been made by the USGS (Reference 22). Based on the existing frequency curve previous to that event, those flows would correspond with greater than a 50-year event. Flows in excess of 3,000 cfs were also recorded on February 9, 1951, December 3, 1975, and December 15, 1979 (recurrence intervals ranging from 20 to 30 years).

Flooding damage to crops and property in the lower Green River Valley has been a problem since the earliest settlement of the area. Flooding occurred almost annually but the impact to the farmland was minimal. After urbanization, the impact of flooding became more severe. Rapid increase in construction of roads, housing, and parking lots increased the volume and rate at which

runoff reached the valley floor. Commercial and industrial landfills have been typically located in the lower valley, resulting in alteration of natural drainage patterns and reduction in overbank storage.

During periods of excessive precipitation, surface and subsurface runoff from the steep valley walls cause groundwater elevations in the valley floor to rise significantly. This creates open ponding in topographically depressed areas. This condition is further aggravated by floodflows and corresponding high water elevations on the Green River, resulting in a perched channel condition, which prevents natural drainage of subsurface water. In some areas, the overlying soils are generally less pervious than the deeper sands and runoff collects in ponds perched above the water table.

The land in the lower Green River Valley from Auburn to Renton had historically been inundated by large floods, such as occurred in December 1933, November 1959, and February 1951, until the construction of the Howard A. Hanson Dam. Since operation commenced in 1962, the dam, in combination with levee systems constructed along river segments below Auburn, has prevented that degree of flooding and limited flood damages. During the floods of January 1965, December 1975, and December 1977, discharges downstream were effectively reduced to nondamaging levels. The 1977 flood would have had the highest unregulated peak of any event since diversion of the White River in 1906 (Reference 23).

The COE is responsible for regulation of dam outflows to a rate that will limit flows at Auburn, together with local inflows below the dam, to 12,000 cfs for up to a standard project flood frequency. This flow rate represents a 2-year recurrence interval flood event on the unregulated discharge frequency curve (Reference 24).

Under regulated conditions, significant flooding still does occur in areas unprotected by levee systems and from interior local drainage runoff that outlets to the Green River. High water levels in the Green River and concerns with existing levee system freeboard and structural integrity limit the discharge of runoff waters carried by Mill Creek (Auburn), the Black River, and various other tributaries. The high water levels of the Green River require that the tributary flows be stored and released by gravity or pump discharge to the river channel in a manner consistent with the requirements of the Green River Management Agreement (Reference 25). Under existing conditions, extensive backwater flooding occurs at the uncontrolled outlets of Mill Creek (Auburn) and Mullen Slough, south and west of State Routes 516 and 167, respectively.

The P1 pumping station pumps the flow from the Black River into the Green River. The firm capacity of the pumping station is significantly less than the peak inflows from Springbrook Creek estimated to reach it. No major backwater effects and associated flooding of overbank areas has occurred (Reference 26) since the

pump station construction in 1972 and later P1 storage pond excavation. However, analysis shows that backwater flooding will occur upstream of the pump station under existing inflow runoff assumptions and hydraulic structure conditions. Peak outflows from the pump station have not exceeded 525 cfs (November 1986 event) with nominal P1 pond storage (Reference 26).

Flooding from the Mill Creek (Kent) drainage, downstream of the Earthworks Park regional stormwater detention basin, results primarily from limited capacity hydraulic structures and low stream gradients, extending downstream to its discharge to Springbrook Creek. Downstream of James Street, east bank overflow will occur at peak flood stages of Mill Creek and flow to the headwaters of Springbrook Creek. Although no stream gage records exist for Mill Creek, outflow from the Earthworks Park detention basin for the January 1986 storm event was estimated to be approximately 90 cfs, computed from surveyed high water mark data and hydraulic rating of the outlet.

Flooding in the Mill Creek (Auburn) drainage is caused by backwater effects from the Green River, and by overburdened channel capacities and restrictive hydraulic capacities at various roadway culvert crossings. During times of high flood stages on the Green River, which can extend from a few days up to a 1-week period for an extreme storm event, storage of Mill Creek floodwater along the valley floor behind the leveed Green River occurs. A portion of the flow, which would normally enter the Green River via Mill Creek, overflows into Mullen Slough for release back to the Green River, as it recedes, at a lower (downstream) hydraulic gradient.

No continuous stream gage records exist within the Mill Creek basin. Crest stage gage records between 1950 and 1970 on the Peasley Canyon tributary drainage indicate a peak recorded discharge of 112 cfs in February 1951 (Reference 27). Mill Creek peak runoff for the January and November 1986 runoff events was not considered extreme based on local accounts and field reconnaissance of extent of flooding.

Flooding along Big Soos Creek is primarily limited to the lower gradient channel reaches in the mid to upper portion of the basin, extending upstream from Kent-Black Diamond Road. Wide marshlands are typical in those reaches with narrow channels with limited hydraulic capacities. Restrictive bridges and other channel constructions exist that result in increased flood levels and corresponding flooding of the low-lying overbanks. Development does not currently encroach significantly on the floodplain.

The maximum recorded floodflow for Big Soos Creek for the 25-year period of record at the USGS stream gage station located above the fish hatchery near the Green River is 1090 cfs. That event occurred on February 28, 1972, and has an approximate recurrence interval based on period of record frequency curve computation of less than 10 years. Floodflows of greater than 1,000 cfs also occurred in November 1960, January 1964, and February 1982.

Preliminary estimates of peak flows for the January and November 1986 storm events do not exceed 900 cfs.

On the White River, the flood of 1975 overtopped and subsequently eroded a section of the levee on the left (south) overbank, upstream of the study area at approximately River Mile (RM) 10.6. It is unlikely that the levee will be repaired within the foreseeable future. Consequently, high flows on the White River are expected to cause flooding in the left overbank, outside the levee, for a distance of approximately 2.6 miles before floodwaters are returned to the main channel at approximately RM 8.0. Approximately 0.8 mile of this overbank flooding occurs within the Auburn corporate limits, inundating areas which are presently wooded and unclassified, but which are earmarked for future single-family residential development.

The amount of storage provided naturally by Lake Sammamish has a moderating influence on flow, and the channelization project by the COE has significantly reduced flood problems on the Sammamish River. The primary areas that are subject to flooding are adjacent to tributary inlets where the channel berm is interrupted.

On Lake Sammamish, the highest flood during a 37-year period of record occurred on February 11, 1951, when the water-surface to the lake reached an elevation of 33.44 feet National Geodetic Vertical Datum (NGVD). Calculations by the COE indicate that the 1951 inflow would have raised the lake elevation to 29 feet NGVD had the present improved outlet been in operation (Reference 28). On December 5, 1975, the lake level reached 29.70 feet NGVD. Generally, the lake level ranges between 25 feet NGVD in summer and 28 feet NGVD in winter.

The largest recorded floodflows on Swamp Creek occurred on January 18, 1986, when a flow of 1,090 cfs (provisional) was measured at the USGS gaging station at Kenmore. This flow exceeds the 100-year event magnitude based on the 23 years of gage record through 1986. The previous measured peak flow on Swamp Creek occurred on March 6, 1972, with a value of approximately 490 cfs.

Numerous private bridges along the lower reaches of Swamp Creek and encroachment on the creek channel from development provides restrictions to flow that may result in increased flood levels and additional overflows to typically low-lying overbank areas. Although localized flooding damages were reported for the January 1986 extreme runoff event, they were primarily related to channel bank erosion, overtopping of roadways and resulting damages (including culvert washouts), and limited damages to residential structures.

The natural channel of North Creek lies on the opposite side of the valley from where the stream now flows. The creek was relocated to the high side of the valley to improve its capacity. The last reported flooding on North Creek occurred in March 1950, when the flow reached 680 cfs. This event was slightly greater than the

100-year recurrence interval. Because land use in the valley is agricultural, the flooding had minimal impact. Highwater in December 1975 was reportedly contained within the North Creek channel. There are no gage records of this event. Localized ponding areas develop every winter because of the poorly drained soils in the valley.

Frequent flooding occurs on Little Bear Creek in the Woodinville area near the confluence of the Sammamish River. The hydraulic structures and channel capacities are limited along the stream reach between the culverts under NE 178th Street and State Route 202. This causes frequent overflows, primarily along the south bank, which are removed from the stream system and flow independently to the Sammamish River. South overbank flows, downstream of the State Route 202 culvert, combine with overflow immediately upstream of the same culvert and flood the low-lying Burlington Northern Railroad underpass area with ponding depths exceeding 6 feet. This overflow and ponding, with outflow across NE 175th Street south to the Sammamish River, frequently floods local commercial structures. Limited overflows along the north creek bank, upstream of NE 178th Street, cause shallow flooding to commercial structures and surrounding roadways, as was experienced in the January 1986 event. Flooding damages upstream of State Route 202 are not typically severe, primarily because of the undeveloped character of areas near the stream course and floodplain.

No operational stream gages exist on Little Bear Creek to directly estimate flooding magnitudes; however, analyses of hydraulic ratings for the channel, culvert, and overflow components provided an approximate peak flow estimate of 650 cfs for the January 1986 event. Review of local precipitation records and comparison with, and transfer of, flow records from adjacent gaged basins indicates that the event most likely represented a recurrence interval of greater than 100-year magnitude. A private commercial business crossing between the State Route 202 crossing and NE 178th Street was washed out during that flooding event.

The flood season for Bear and Evans Creeks is from October to March. The greatest floods are caused by rainstorms although melting snow may occasionally augment flooding. Storm runoff in the Bear Creek basin is comparatively slow because of the moderate terrain, the unimproved condition of the channels, and the small amount of residential and commercial developments in the watershed. As a rule, the stream rises to a peak stage within a day and the duration of flooding is less than a week.

The largest recorded floodflow on Bear Creek within the limited period of gage record was a recent event on January 18, 1986, with estimated provisional peak flows of 390 cfs at the USGS gage near Redmond (upstream of Cottage Lake Creek) and 1,550 cfs at the USGS gage at Redmond, upstream of the Sammamish River confluence. Based on updated frequency curves including that event, the estimated recurrence interval of floodflows within the Bear Creek basin for

that event is approximately 40 to 50 years. The previous recorded peak flows at those gages were 250 cfs and 456 cfs, respectively, although the gage record is limited to 8 years for each station.

There are numerous bridges over Bear Creek within the study area, many of them private crossings with restrictions that limit capacities and increase upstream flood levels. During major floods, debris collecting at these structures may significantly increase the extent of flooding and potential for overflow with resulting damages to roadways and adjacent structures. Damage reports from the January 1986 event were not extensive; however, roadways were overtopped at a few crossings and a mobile home park was flooded and had to be evacuated along the lower reaches of Bear Creek.

The flood season for Issaquah and Tibbetts Creeks is during the winter from October to March. The greatest floods are caused by rainstorms although melting snow occasionally augments flooding. The creeks rise quickly during heavy rainfall because of the steep terrain in the watersheds. As a rule, the streams rise to crest stage within a day and the duration of flooding is less than a week.

The largest recorded peak floodflow on Issaquah Creek in 23 years of USGS gage record since 1964 occurred on November 24, 1986, when a peak discharge of 3,050 cfs (provisional) was recorded at the USGS gage "near mouth, near Issaquah" (Reference 22). That floodflow represents an approximate 25-year recurrence interval based on frequency curves for gage record prior to that event. The flooding event of January 18, 1986, produced the third highest period of record gage flow on Issaquah Creek, estimated at 2,400 cfs (provisional) by the USGS (Reference 29), with an estimated recurrence interval of less than 10 years. Peak runoff for a January 1, 1964, event of 2,870 cfs represents the second highest flow on gage record.

There are numerous bridges spanning Issaquah Creek. The clearance and flow capacity of many of these bridges are restricted. During major floods, debris collecting at these structures may significantly increase the extent of flooding. Development along Issaquah Creek has encroached on the channel, particularly in the downstream reaches in and surrounding the City of Issaquah. This encroachment reduces the flood-carrying capacity of the channel, increasing the flood depths in adjacent areas. Local accounts and aerial photographs (Reference 29) of flooding in the City of Issaquah and along the West Fork Tributary indicated that flood levels for the November 1986 event were the highest in recent years. Numerous roads and structures were inundated. Peak floodflows from the West Fork of Issaquah Creek are relatively small compared to those of the mainstem; however, significant areas of flooding occur in the upper reaches of that tributary. The flooding is a result of an extremely low gradient stream channel, having a small channel capacity with wide and flat overbanks.

Flood damage on May Creek occurs mainly at the mouth where a lumber mill has been built on the small delta there. Upstream of Interstate Highway 405, May Creek flows generally within a canyon. Flooding problems in this reach are the result of surface runoff and ground-water seepage from the steep canyon walls rather than excessive overflow of May Creek.

For the reach of May Creek under study upstream of the Coal Creek Parkway, flooding results from channel and bridge capacities restrictions and flattening of stream gradients in the upper May Valley area. For the reach extending upstream to 146th Avenue SE, flooding is typically confined to a relatively narrow, steep channel. Upstream from that crossing, the floodplain expands to the overbanks where floodplain inundation widths between 500 and 1,000 feet are typical for significant storm events. Filling of floodplain overbanks and reduction in storage, and debris buildup at the hydraulic structures, can increase flood levels and the extent of upstream overbank flooding. Flooding extent on the May Creek Tributary, upstream of SE May Valley Road, results primarily from backwater effects of the main channel at their confluence.

A USGS stream gage exists on May Creek (discontinued) at its mouth near Renton. The peak flow recorded at that station during the 15 years of gage operation was 510 cfs on December 3, 1975. This corresponds to a storm with a recurrence interval of approximately 10 to 15 years based on the period of record frequency curve. High water marks located immediately upstream and downstream of the gage were observed for the January 1986 storm event. Results of approximate rating analyses at the gage for that event indicated floodflows potentially exceeding 800 cfs with an expected recurrence interval of greater than 50 years. Flooding, including inundation of structures in the upper May Valley area, were reported for that event.

Flooding along Vasa Creek generally occurs during the winter months, November through February, when storms originating over the Pacific Ocean bring intense precipitation. These storms usually last two or three days, and streams may increase from low flow to flood discharge within 6 to 12 hours. The major flood problems are those of inundation and damage of private property from out-of-bank floodwaters, primarily along low gradient reaches of the streams.

The Cedar River is subject to frequent flooding damages, particularly in its upper reaches, beginning with minor flooding and bank erosion when the river flow, measured at Landsburg, exceeds 2,500 cfs. This magnitude of flows typically occurs annually. Major flooding occurs when river flows reach 4,000 cfs, which happens on the average once every 5 to 10 years. Topographic and climatic conditions of the basin produce two high-water periods during the year. The highest flows normally result from extreme rainfall and the accompanying snowmelt that can occur during the late fall and early winter. Flooding can also occur during spring months, resulting primarily from snowmelt events.

Stream flow on the Cedar River has been recorded almost continuously since 1895 at the gage near Landsburg. The greatest flood which has occurred over the past 50 years took place on December 4, 1975, with a peak discharge at Landsburg of 8,800 cfs. Based on an updated frequency curve for the Renton USGS stream gage for the 40 years of record through 1985, the recurrence interval for that event exceeded 100 years. Preliminary peak flow estimates by the USGS (Reference 22) for the recent November 1986 event indicate a peak flow of approximately 5,300 cfs, with a recurrence interval of approximately 100 years. Preliminary peak flow estimates by the USGS (Reference 22) for the recent November 1986 event indicate a peak flow of approximately 5,300 cfs, with a recurrence interval of approximately 10 years.

Damages in the Cedar River basin from the December 1975 flood event were estimated at $1,760,000. In the reach under study, the west bank of an improved channel at the mouth of the Cedar River was overtopped above the South Boeing Bridge and the Renton Municipal Airport experienced significant flooding and had to close down until the floodwaters receded. Extent of flooding for the November 1986 event in the lower 2-mile reach under study was mainly limited to the improved channel with the exception of some overbank flooding adjacent to the Renton Airfield. Upstream of the improved channel, portions of the Maplewood Addition and other scattered residential developments have been inundated by past flooding events. Log and debris jams have been experienced on the lower river channel, especially during the 1933 and 1975 floods.

The lower reach of the river channel, through the City of Renton, has been aggrading in recent years based on comparison of current and previous cross section data. This may result in increases in flood levels and potential overflows.

A reach of the Cedar River about 0.8 mile in length along the right bank immediately upstream of Interstate 405 highway is seriously obstructed. Various private enterprises along this river reach have encroached on the stream bed by dumping waste concrete and asphaltic concrete. A fill has been placed, paved, and riprapped to accommodate parking facilities for tenants residing at the Riveria Motel. This fill encroaches into the river 25 to 40 feet along the entire width of the property. Encroachment of this type reduces the river channel capacity, creating higher water levels adjacent to and upstream of these areas.

Flooding along Mercer Creek, Richards Creek and its tributaries, Kelsey Creek and its tributaries, and North Branch Mercer Creek generally occurs during the winter months, November through February, when storms originating over the Pacific Ocean bring intense precipitation. These storms usually last two to three days and streams may increase from low flow to flood discharge within 6 to 12 hours. The major flood problems are those of inundation and damage of private property from out-of-bank floodwaters, primarily along low-gradient reaches of the storms.

Ice jams have little impact on flooding when culverts and bridges are free of debris. Flood elevations, however, are increased due to the limited capacity of some culverts. This limited capacity in some cases is intentional as a means of peak-flow retention.

Numerous bridges and culvert systems exist along Thorton Creek from its outlet to Lake Washington at Matthews Park to its forks and extending upstream to and above Interstate 405. Flooding for moderate runoff events is primarily contained by the Thornton Creek drainage system. However, the restrictions imposed by the crossings and encroachment on the channel in this heavily urbanized basin result in backwater flooding and overflow of channel banks and structures, with resulting damages, under more severe runoff conditions. Debris collection, particularly as it affects outflow to the diversion works, has had significant impacts on increasing inundation levels during past flooding events. Since the November 1978 storm event that resulted in flooding problems augmented by debris, the City of Seattle has improved the operation and maintenance of the diversion works structure, located at RM 1.3 on Thornton Creek, below the confluence of the North and South Forks. This diversion works structure diverts flows up to an estimated 340 cfs for the 100-year event into an abandoned 72-inch concrete sewer pipe. This pipe discharges directly into Lake Washington just north of Matthews Beach. The diversion structure functioned adequately during the January 1986 storm event. Based on hydraulic rating analyses performed from surveyed high water marks, peak runoff for that event was estimated at 560 cfs above the diversion and downstream of the creek forks and 220 cfs in the main channel downstream of the diversion works.

Some minor flooding has occurred in the past in the lower reaches of McAleer Creek. This flooding was caused by hydraulic structures of inadequate capacity or sedimentation and debris accumulation. Particular dates of past flooding are not available.

Flooding along Coal Creek generally occurs during the winter months, November through February, when storms originating over the Pacific Ocean bring intense precipitation. These storms usually last two to three days, and streams may increase from low flow to flood discharge within 6 to 12 hours. The major flood problems are those of inundation and damage of private property from out-of-bank floodwaters, primarily along low gradient reaches of the streams.

The flood season for Forbes Creek in the lower Puget Sound region is normally during the winter from October to March. The larger floods are caused by rainfall, although melting snow occasionally augments flooding.

Forbes Creek has no gaging station and there is no written record of historical flooding. Discussions with residents revealed a history of localized flooding of short durations caused by brief periods of intense rainfall.

Debris collecting at structures and residents encroaching on the channel capacity by placing various types of materials to stabilize the streambank, may significantly increase the extent of flooding.

Flooding along Lyon Creek has occurred in the lower reaches and also in the southwest corner of NE 185th Street and 35th Avenue NE nearly every winter. Hydraulic capacity has been greatly reduced in the two concrete box culverts under Bothell Way Northeast. Sedimentation in the southern portion, up to approximately 2 feet from the original invert, has diverted all the flow through the northern portion. At higher flows this would create unnecessary backwater in the upstream channel in front of the shopping center complex or the sediment could become dislodged causing a blockage elsewhere downstream.

Flooding along Yarrow Creek, Meydenbauer Creek, and North Fork Meydenbauer Creek generally occurs during the winter months, November through February, when storms originating over the Pacific Ocean bring intense precipitation. These storms usually last two to three days, and streams may increase from low flow to flood discharge within 6 to 12 hours. The major flood problems are those of inundation and damage of private property from out-of-bank floodwaters, primarily along low-gradient reaches of the streams.

The major source of flooding within Skykomish is the South Fork Skykomish River. Flooding occurs primarily during the winter due to rainstorms which bring intense precipitation and are accompanied by warm winds that rapidly melt the accumulated snowpack. During such storms, river discharges may increase from a relatively low base flow to near flood stage within a few hours.

Residents report that the largest flood on record occurred in November 1959. The return period for that flood is approximately 30 years. Although a dike contained most of this flow in the eastern part of the town, water covered the central and western areas. A flood also occurred in 1975, and floodwaters reached the tops of the levees. The return period for that flood is less than 3 years.

The other potential source of flooding within Skykomish is Maloney Creek, which meets the South Fork Skykomish River near the western corporate limits. This stream flooded in 1933 when a logjam that had been holding back the flow broke. No information on the recurrence interval for this flood is available. There has been no flooding reported on Maloney Creek since that time.

The flooding problems in the lower portions of Miller and Walker Creeks are a result of increasing development, which has caused more rapid runoff in those creeks. This development is primarily outside the City of Normandy Park boundary and has been the subject of much discussion and some litigation. Damage has generally been limited to stream erosion and some limited flooding around residences.

The area most subject to flooding along the lower portions of Des Moines Creek is owned by the Covenant Beach Bible Camp.

The streamflow of Des Moines Creek exceeds the channel capacity several times each year, resulting in several thousands of dollars of damage each year. Damage is usually limited to bank erosion, overbank deposition, and some shallow flooding in and around occasionally occupied camp cottages.

The last major flood event along Miller and Des Moines Creeks was in February 1972, and had a recurrence interval estimated at 10 years. As a result of Miller Creek flooding, a suit was brought against the county to restrict the diameter of the 8-1/2 foot culvert on First Avenue South through which Miller Creek passes. A 6-foot diameter collar was placed in the upper end of the culvert. The effects of the collar have been included in the hydraulic analysis of Miller Creek. As a result of Des Moines Creek flooding, a 4-foot-deep hole was eroded around one of the cottages and water up to approximately 2 feet deep was standing in others. The December 15, 1977, high tide provided a high tide in Puget Sound of an approximate recurrence interval of 70 years. This high tide was accompanied by very little wind.

Flooding occurs at numerous locations along Longfellow Creek because of restricted channel and culvert capacities and partial obstruction of the natural channel because of debris accumulation. Overtopping of the majority of the roadway crossing between SW Brandon Street and SW Myrtle Street, including localized flooding of properties, structures, and bank erosion, occurred during the January 1986 flooding event. Downstream of the study limit, flows at SW Nevada Street overtopped an approximate 30-foot-high roadway fill, partly because of culvert debris blockage, and resulted in failure of that crossing with extreme floodflows released to the downstream drainage. Surface flooding also occurs at locations where the lateral storm drainage systems have insufficient capacity to convey storm runoff into Longfellow Creek.

The existing culverts that convey Rolling Hills Creek under Interstate 405 at its intersection with State Route 167, and through a closed culvert behind the Renton Cinema, cause overbank flooding north of the channel in the parking areas for the Cinema and the Renton Village Development. Significant reduction in peak flows through the downstream highway culvert is achieved from routing of floodwaters that pond in the overbank.

2.4 Flood Protection Measures

The Seattle office of the National Weather Service maintains and collects hydrometeorological reports from a network of substations and uses this information to prepare flood forecasts for King County streams. Flood warnings are issued by them and given wide dissemination through all media by cooperative efforts with local and Federal agencies.

Levees on the Tolt River, near its confluence with the Snoqualmie River, provide moderate protection to urban development in the City of Carnation and to adjacent agricultural lands. A 600-acre agricultural area on the left bank of the Snoqualmie River, 1 mile downstream from Fall City, is protected from minor spring floods by a levee approximately 1 mile long. Levees along the lower 2 miles of both banks of the Raging River and its confluence with the Snoqualmie River protect a portion of Fall City and agricultural lands. Levees along the South Fork of the Snoqualmie River provide approximately 50-year flood protection to the City of North Bend.

Bank erosion occurs at nearly all river stages, but is most severe during medium and high flows. Bank protection projects have been constructed at numerous locations along the Snoqualmie River and its major tributaries by riparian owners, local governmental agencies, and the Federal government.

In 1960, the City of Seattle constructed a water supply project on the South Fork of the Tolt River. Total storage capacity of the reservoir is about 58,000 acre-feet. Although flood control storage is not a project feature, some minor storage of flood discharges does occur.

The COE operates the Howard A. Hanson Dam at Eagle Gorge on the upper Green River. Completed in 1962, the dam provides approximately a 500- to 600-year level of protection against overbank flooding by the Green River. The dam is a rockfill embankment approximately 235 feet high with a gated spillway and a maximum reservoir elevation of 1,222 feet. Stored water is released as soon as possible after a flood to provide for the possibility of a second flood. The COE current operation of Hanson Dam provides that all runoff is passed through the dam until the flow at the Auburn gage is expected to reach 12,000 cfs. At that point, further releases are regulated to maintain no more than 12,000 cfs at Auburn.

Channelization and levee construction, primarily downstream of Auburn, has provided additional flood protection for the overbanks. A total of approximately 16 miles of levees have been constructed in addition to roadway systems that function as levees, between State Route 18 at Auburn and the Black River confluence at Tukwila.

Based on information received from the COE, the levee system along the left (west) bank of the Green River, from Strander Boulevard to RM 16.7, in the City of Tukwila, will adequately provide protection against overtopping or failure caused by the 100-year flood, with at least two feet of freeboard.

King County and the various incorporated citied along the Green River (Tukwila, Renton, Kent, and Auburn) are responsible for maintenance of portions of those levee systems. Since the adoption of enabling legislation by the State of Washington in 1945, the State and King County have combined to control riverbank erosion.

The Black River basin, including Springbrook Creek, has been the object of the ongoing East Side Green River Watershed Study (Reference 30). That study was initiated in 1965 by the SCS with the support of King County and the Green River Valley cities. The P1 pumping station and storage pond, as part of the plan, were constructed in 1972 and 1984, respectively. A major box culvert replacement was installed at SW Grady Way in 1986 and is considered in this study in its partially obstructed condition. Preliminary plans exist for the construction of the P1 channel from SW Grady Way north to the storage pond and additional culvert replacements under Interstate 405 and SW 16th Street. The timing and funding for construction of these improvements is not finalized; therefore, they are not considered in this study.

A regional detention basin was constructed on Mill Creek (Kent) in 1981 at Earthworks Park in order to provide flood control storage for reduction in downstream peak runoff. A second smaller upstream detention basin was previously constructed in the Upper Mill Creek basin to provide for additional reduction in peak flows to the lower valley areas. This has reduced the magnitude and frequency of, but not eliminated, flooding problems downstream of the Earthworks Park structure. The City of Kent is developing a plan to construct more detention storage in order to further alleviate their flooding problems.

Partial reduction in peak runoff conveyed to Mill Creek (Auburn) is provided by stormwater detention storage basins constructed on the south tributary to Mill Creek, above its confluence with the Peasely Canyon tributary. Locally referred to as the "Auburn 400" ponds, and located east of and adjacent to State Route 167 and 15th Street SW, they provide an unidentified effect on routing of peak tributary flows to Mill Creek. Additional regional detention storage is being considered for other study reaches of Mill Creek, downstream of State Route 18, in an attempt to maintain adequate storage capacities for limiting downstream discharges with continued floodplain development.

On the White River, peak flows are regulated by the Mud Mountain Dam, a structure built by the COE. Storage was initiated in 1942, and the project was finally completed in 1953. The structure is an earth and rockfill dam, 425 feet above bedrock. The reservoir has a storage capacity of 106,000 acre-feet of water and is capable of controlling floods 50 percent greater than the maximum flow of record.

Levees have also been constructed along portions of the White River along its course through the Cities of Auburn and Pacific.

The amount of storage provided naturally by Lake Sammamish has a moderating influence on flow, and the channelization project of the Sammamish River by the COE has significantly reduced flood problems. Major drainage improvement and partial flood protection are provided by the channel improvement project completed in 1966 by the COE for King County. The project extends from below Lake

Sammamish to Kenmore, a distance of approximately 14 miles. The river channel was deepened an average of 5 feet and increased in width from a former average of about 15 feet to the improved 32 to 50 feet. Excavated material from the channel enlargement was used to construct the levees. A low weir with a crest elevation of 24.5 feet NGVD was constructed to control the outlet of Lake Sammamish. The channel improvement and outlet project provide protection against spring floods with a recurrence interval of 10 years without causing Lake Sammamish to rise higher than elevation 29.0 feet NGVD. No significant flood control measures have been developed on the Sammamish River tributaries except for channelization of the lower end of Bear Creek at Redmond (Reference 28).

Most of the channel of May Creek is in its natural condition. The lower 1,000 feet have been channelized to alleviate flooding problems caused by channel aggradation resulting from excessive siltation problems.

King County has established a flood fighting plan that is activated when the Cedar River reaches a discharge of about 4,000 cfs at Renton. The plan consists of patrolling and making emergency repairs to contain this discharge. When the flow exceeds 4,000 cfs, efforts are concentrated on protecting the safety of the affected residents and their personal property. The Sheriff's office, the Office of Civil Defense, fire districts, and the Red Cross are notified for assistance.

The lower 1-mile reach of the Cedar River channel was initially stabilized in 1912. King County and the City of Renton have provided major capital improvements and maintenance for flood and erosion control along the Cedar River. This has included riprap bank protection works, bulkheads construction, cleaning, and snag removal. Major reconstruction of levees and bank protection work was accomplished after the December 1975 flood. River channel dredging upstream from the mouth of the Cedar River has been performed, most recently in 1972, in an attempt to maintain 100-year flood protection of the improved channel system through the City of Renton.

The major flood control improvement to Thornton Creek is the diversion works with a 72-inch overflow pipeline to Lake Washington. The diversion reduces the peak flows to the lower mainstem reach of Thornton Creek such that only minimal downstream flooding hazards exist up to a 100-year frequency existing conditions flooding event. This assumes that full unobstructed capacity is maintained to the diversion pipeline.

In 1946, the COE constructed a levee along the south bank of South Fork Skykomish River in Skykomish. This levee is approximately 970 feet long and provides variable flood protection to a portion of the town.

A flood protection structure that significantly influences flooding on Des Moines Creek is the road embankment from Marine View Drive located in the City of Des Moines, which creates enough detention storage to reduce the peak 100-year flood by almost 50 percent on Des Moines Creek.

In 1983, the City of Seattle constructed a regional stormwater detention basin on Longfellow Creek south of SW Webster Street. The detention basin has helped reduce downstream flooding problems, although basin overflow for more severe storms, as evidenced in the January 1986 event, will reduce the basin's effectiveness on reduction in peak flows.

There are no other flood control measures for other streams studied that significantly reduce flooding.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

For those flooding sources being restudied or that are extensions of previous detailed riverine studies, peak discharge results presented in the previous Flood Insurance Studies for King County and the Cities of Auburn, Kent, and Renton (References 1, 2, 8, and 15) were compared with updated discharges estimated to determine the appropriate values to be used in this revised study. The peak discharge estimates assume that existing basin hydraulic structures

remain unobstructed and existing upstream dams or impoundment structures remain intact with no changes in operating characteristics.

Discharge-frequency for the Snoqualmie River, South, Middle, and North Forks Snoqualmie River, Sammamish River, North Creek, Bear Creek, Evans Creek, Issaquah Creek, North and East Forks Issaquah Creek, Tibbetts Creek, Vasa Creek, Cedar River, Mercer Creek, Right Channel Mercer Creek, Richards Creek, East and West Tributaries Richards Creek, Kelsey Creek, West Tributary Kelsey Creek, East Branch of West Tributary Kelsey Creek, North Branch Mercer Creek, McAleer Creek, Coal Creek, Lyon Creek, Meydenbauer Creek, North Fork Meydenbauer Creek, South Fork Skykomish River, Maloney Creek, and the Tolt River were developed from USGS stream gaging stations on the respective streams by applying the standard log-Pearson Type III methods with the expected probability corrections as outlined by the U.S. Water Resources Council (Reference 31).

Discharge-frequency relationships in the revised study for Raging River, Issaquah Creek, Cedar River, Swamp Creek, May Creek, May Creek Tributary, and Big Soos Creek were developed from streamflow records at USGS gages within those watersheds. The gage reference numbers, descriptions, and periods of record (Reference 32) used in the analyses are summarized below. That listing includes additional gages used for correlating and transferring flows between local, hydrologically similar basins or for comparison of results. The Flood Flow Frequency Analysis computer program (Reference 15) was used to determine the discharge-frequency relationships by applying log-Pearson Type III analysis techniques in accordance with methods presented in USGS Bulletin 17B (Reference 33) to the annual peak flow data for each gage site.

USGS GAGES

Flooding Source	USGS Gage Ref. No.	USGS Gage Description	Period of Record
Snoqualmie River	12-1490	Near Carnation	1930-1965
N/A		Near Snoqualmie Falls	1929-1965
12-1445000		Near Snoqualmie	1959-1978
South Fork Snoqualmie River	N/A	At North Bend 1918-26, 1930-38, 1946-50, 1961-78	1911-12, 1914-16,
North Fork Snoqualmie River	N/A	Near North Bend 1920, 1922-26, 1930	1910-12, 1914-18,
Middle Fork Snoquaimie River	N/A	Near Tanner	1962-1978

Raging River	12-145500	Near Fall City	1946-1985
Tolt River	12-148500	Near Carnation	1959-1971
Green River	N/A	Near Tukwila	1959-1963
N/A	Near Auburn		1937-1962
N/A	Near Black Diamond		1940-1948
N/A	Near Palmer		1932-1962
N/A	Near Lester		1946-1962
Big Soos Creek	12-112600	Above Hatchery, Near Auburn	1961-1986
Sammamish River	1250	At Bothell	1940-1963
	N/A	Near Redmond	1940-1957
Swamp Creek	12-127100	At Kenmore	1964-1986
Little Bear Creek	12-126000	North Creek, Near Bothell	1946-1976, 1986
Bear Creek	12-122500	Near Redmond	1946-49, 1980-81, 1986
	12-124500	At Redmond	1946-50, 1956-58, 1986
	12-124000	Evans Creek, Above Mouth Near Redmond	1956-1977
Issaquah Creek	12-121600	Near Mouth	1964-present
	12-121000	Near Issaquah	1946-1964
Tibbetts Creek	12-121700	Near Issaquah	1964-present
May Creek	12-119600	At Mouth, Near Renton	1965-1979
Cedar River	12-119000	At Mouth	1946-1985
	12-1175	Near Landsburg	1948-present
McAleer Creek	12-1276	At Lake Forest Park	1963-72, 1973-74
Lyon Creek	12-1273	At Lake Forest Park	1964-68, 1969-75
Mercer Creek	N/A	At Bellevue	1945-present
Coal Creek	N/A	At Bellevue	1963-present
North Branch Mercer Creek	N/A	At Bellevue	1949-present
South Fork Skykomish River	12-1330	Near Index	69 years
	12-1305	Near Skykomish	26 years
Beckler River	12-1310	Near Skykomish	28 years

Discharge-frequency relationships established for gage locations were transferred to selected runoff concentration points along the study reaches through the application of regional regression techniques per published regression equations (Reference 34).

USGS gage flow records from the adjacent, hydrologically similar North Creek basin were used to establish flow estimates for Little Bear Creek. Evaluation of peak recurrence interval discharges in the lower reaches of Little Bear Creek, downstream of the State Route 202 crossing, include reductions in main channel flow to reflect overflows away from the main channel that enter the Sammamish River at other locations.

Updated hydrology for flooding sources either being restudied or that are extensions of existing detailed studies were compared using statistical confidence limits with existing published Flood Insurance Study discharges at identified locations. Comparison of peak discharge estimates for the May Creek gage site with those published in the previous Flood Insurance Study for the City of Renton indicated no significant statistical differences. Therefore, in accordance with FEMA guidelines, the previous flow estimates for the gage site have been used in the present study.

Recurrence interval peak discharge estimates established for the added detailed study reach of Bear Creek, upstream from its confluence with Cottage Lake Creek, are based on the results of the statistical analysis of annual peak flows at USGS gage No. 12-122500 near Redmond. The limited period of gage record (8 years, including January 1986 event provisional flow estimates) would normally preclude analysis using this method. However, additional gages located on Cottage Lake Creek (No. 12-123000), Evans Creek (No. 12-124000), and on the downstream reach of mainstream Bear Creek, (No. 12-124500) provided adequate data for comparative assessment of results.

Discharge-frequency relationships for Thornton Creek, Longfellow Creek, Mill Creek (Auburn), and Rolling Hills Creek were developed using the COE HEC-1 computer program (Reference 35). The basic application of this synthetic hydrograph model included computation of drainage subbasin runoff hydrographs using the SCS Type 1A storm distribution (Mill Creek and Rolling Hills Creek), routing of those hydrographs through channel reaches and detention storage areas, and combining them with downstream subbasin hydrographs at selected study reach runoff concentration points. Calibration of those models to discharge estimates, developed from high water mark data collected for the January 1986 event, was performed.

Peak-flow estimates for Thornton Creek include consideration of unobstructed diversion of flows to the overflow pipeline to Lake Washington. Runoff estimates for Thornton and Longfellow Creeks used a multiple peak design storm distribution pattern based on the actual January 17 through 19, 1986, storm event, taken from a network of local precipitation gage data (Reference 36). In

addition to localized culvert backwater routing effects, routing of flows through the SW Webster Street detention basin and outlet structure was included in the Longfellow Creek modeling analyses. Discharge estimates computed at the mouth of Mill Creek (Auburn) consider noncoincidence of peak flows in the Green River and Mill Creek. Storage routing effects of backwater storage at the location have therefore not been considered in this analysis. Discharge estimates for Mill Creek for the floodway determination were modified to reflect reduction in storage with encroachment on the storage provided by the natural floodplain.

Recent modeling analyses of the Mill Creek (Kent) and the Springbrook Creek basins using the SCS TR-20 hydrograph program have been performed by a local consultant for the City of Kent Drainage Master Plan (Reference 37). That study developed 25- and 100-year recurrence interval discharge estimates based on a 12-hour duration, SCS Type 1A storm distribution for the valley floor basins. It included consideration of significant storage-routing components within the Mill/Springbrook Creek system, including the recently completed Earthworks Park stormwater detention facility. The discharge estimates presented in the City of Kent Drainage Master Plan and supplemental computer output files, for existing land use conditions have been accepted for use in this restudy. Additional recurrence interval flows were extrapolated from the computer flows. The resultant flow estimates were reduced by overflow estimates to Springbrook Creek north of James Street, computed using hydraulic backwater rating methods, to provide the downstream estimates.

Stream gage records are not available for the Black River and Springbrook Creek. In the absence of gaged discharge data for statistical determination of peak flow estimates, information from several previous hydrologic modeling studies within the Black River basin were collected and reviewed for comparison of results and for determination of acceptability for use in the restudy. Synthetic unit hydrograph modeling of basin runoff has been performed by the COE using the HEC-1 Flood Hydrograph model (Reference 38); the SCS using the TR-20 model (Reference 39); by the previous study contractor for the existing Renton Flood Insurance Study using the TR-20 model (Reference 15); and, more recently, by other consultants for upstream reaches of the basin, using the TR-20 model. The flow estimates from the previous Flood Insurance Study were determined to be the most representative of the conditions existing in the basin at the time of this restudy, and were therefore used. Since the previous Flood Insurance Study only calculated the 10- and 100-year hydrographs, the 50-year hydrograph was interpolated from those previously computed. The 500-year hydrograph was not analyzed because of the extensive changes in overbank storage that occur at P1 pond stages in excess on the 100-year recurrence interval.

The Green River basin has been studied extensively by the Seattle District of the COE. The COE operation of Howard A. Hanson Dam provides flow regulation for flood protection to the downstream

river reaches, particularly the lower Green River Valley downstream from Auburn. Current COE operation of the dam regulates the peak downstream flow releases up to the standard project flood to 12,000 cfs at the USGS Auburn gage. This includes consideration of tributary inflows downstream of the dam (i.e., Newaukum Creek and Big Soos Creek). Discharge-frequency analyses have been performed by the COE as part of the Green River Flood Reduction Study (Reference 23) for estimation of peak unregulated and regulated floodflows at the Auburn steam gage. Results of those analyses were reviewed and used in this restudy. The flows are also in agreement with previously published Flood Insurance Study discharge estimates.

Discharge-frequency relationships for the White River were obtained from a backwater channel-capacity study by the COE (Reference 40). The selected stations were Mud Mountain Dam and the White River at the mouth. The peak discharges were adjusted for the White River near Auburn. Those adjusted discharges were used directly for this study.

Because there are no streamflow records on Forbes Creek and Yarrow Creek, runoffs for the floods of interest were calculated using rainfall relationships developed for the area and a computerized stormwater routing model. The model incorporates the unit hydrograph methodology developed by the SCS (Reference 41). The peak discharges obtained by this method were comparable to those derived from regional regression equations published by the USGS (Reference 42).

The hydrologic analysis of Miller and Walker Creeks in the Sea-Tac communities plan (Reference 43) used a stormwater management model developed in earlier river basin studies. A single large storm and measurements at temporary gaging stations along the creeks were used to calibrate the model, and flows for the 10-, 50-, and 100-year storms were computed. The 500-year flood was estimated by extending the curve through the computed points.

A gaging station on Miller Creek was established in 1973 to provide a better understanding of hydrologic conditions in the stream.

No gage records exist for Des Moines Creek. Because of highly similar drainage basin characteristics, peak discharges per square mile for Miller and Walker Creeks were applied to the Des Moines Creek drainage basin. These flows gave flood elevations well in excess of local experience. The excessive flow rates were explainable because an 80-foot-high road embankment (Marine View Drive) crosses Des Moines Creek Canyon at the upper end of the detailed study area. The box culvert flowing under the embankment has a capacity of 300 cfs before peak flow storage begins. However, even assuming that no outflow was allowed, the impoundment can store 65 percent of the runoff that would occur during a 6-day, 100-year storm. Therefore, reservoir routing capacity exists to significantly reduce peak flows. Utilizing rainfall-runoff data and techniques developed by the study contractor during a recent

study of a similar urban area located several miles to the north, a 100-year synthetic runoff hydrograph was developed for a 6-day storm for Des Moines Creek.

The 100-year hydrograph was routed through the storage reservoir created by the road embankment, reducing the unrouted peak discharge. This same percentage of flow reduction was applied to the 10-, 50-, and 500-year unrouted peak flows.

Peak discharge-drainage area relationships for the streams studied by detailed methods are shown in Table 1.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross section data for the backwater analysis for Miller Creek, Walker Creek, and a portion of Des Moines Creek were taken from topographic maps with 2 foot contour intervals (Reference 44). Cross section data for North Creek and White River (left bank overflow) were taken from aerial photographs (References 45 and 46). Cross section data for the Snoqualmie River and North, Middle, and South Forks Snoqualmie River were obtained from field surveys and aerial photographs (References 1, 47, 48, and 49). The cross section data for the backwater analyses for the remaining streams studied by detailed methods were obtained by field survey. Cross section data for the overbank areas of Green River, Tibbetts Creek, Issaquah Creek, and East Fork Issaquah Creek were based on topographic base maps (References 50 and 51).

The flooding potential, in the form of ponding, for the unnamed drainageway in the central business district in Kirkland, is directly related to the capacity of the existing stormwater drainage system. The capacity of this system was determined and removed from the runoff produced by the design storm. The volume of the remaining excess runoff was then compared to a storage-elevation curve developed for the central business district. This comparison yielded the maximum expected elevation for the predicted 100-year event. Based on a Letter of Map Revision (LOMR) dated Jaunary 30, 1989, and due to improvements done in that area, the drainageway was moved to reflect the LOMR.

Water-surface elevations of floods of the selected recurrence intervals on Mercer Creek, Right Channel Mercer Creek, Meydenbauer Creek, North Fork Meydenbauer Creek, Coal Creek, Vasa Creek, Richards Creek East Tributary, Richards Creek West Tributary, Kelsey Creek, West Tributary Kelsey Creek, East Branch of West Tributary Kelsey Creek, North Branch Mercer Creek, and Yarrow Creek were computed using the USGS E-431 step-backwater computer model (Reference 52). Water-surface elevations of floods of the selected recurrence intervals on Lyon Creek and McAleer Creek downstream of Northeast 178th Street were computed by hand calculations.

TABLE 1 - SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Snoqualmie River					
At mouth	693.0	42,000	54,000	60,000	68,000
At Duvall	645.0	42,480	54,610	59,610	71,530
At Carnation	603.0	46,800	65,200	73,000	92,000
Near Snoqualmie	375.0	50,000	71,000	80,000	103,000
Raging River					
At USGS gage 12-145500	30.6	3,080	4,150	4,610	5,660
Above Interstate Highway 90	25.7	2,640	3,560	3,960	4,860
Above Lake Creek confluence	20.2	2,130	2,880	3,210	3,940
Above Deep Creek confluence	13.3	1,470	1,990	2,230	2,740
Middle Fork Snoqualmie River					
Above confluence with North Fork	171.0	28,000	38,300	43,800	55,800
North Fork Snoqualmie River					
At mouth	103.0	12,500	18,000	20,500	27,500
South Fork Snoqualmie River					
At North Bend	82.0	9,000	13,000	15,000	19,700
Green River					
At Renton	450.0	12,000[1]	12,000[1]	12,000[1]	12,000[1]
At Tukwila	450.0	12,000[1]	12,000[1]	12,000[1]	12,000[1]
At Kent	400.0	12,000[1]	12,000[1]	12,000[1]	12,000[1]
At Auburn	399.0	12,000[1]	12,000[1]	12,000[1]	12,000[1]
At USGS gage 12-113000 (Auburn)	339.0	12,000[1]	12,000[1]	12,000[1]	12,000[1]
Below Howard A. Hanson Dam	220.0	11,000[1]	11,000[1]	11,000[1]	11,000[1]
Above Howard A. Hanson Dam	215.0	20,050	29,250	33,500	49,000

[1]Discharges constant due to controlled release from Howard A. Hanson Dam

TABLE 1 - SUMMARY OF DISCHARGES (Cont'd)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Black River					
Above Green River confluence	24.8	400[1]	400[1]	400[1]	400[1]
At P-1 pump station inlet	24.8	650	1,040	1,230	1,730
Springbrook Creek					
Upstream of confluence with Black River	21.9	590[2]	930	1,100[2]	1,550
Downstream of confluence with Mill Creek (River Mile 3.03)	16.1	680[1]	--	1,055	--
Mill Creek (Kent)					
At confluence with Springbrook Creek	9.2	380	--	650	--
At Highway 167 culvert entrance	3.1	110	125	130	140
At Bowen-Scarff culvert outlet	2.9	110	115	120	130
Downstream of Springbrook Creek Overflow	2.7	85	90	100	110
At James Street	2.6	70	110	140	180
Mill Creek (Auburn)					
Above confluence with Green River	12.8	250	360	410	510
At 277th Street	11.7	230/220	330/320	370/360	480/470
At 37th Street, N.W.	9.8	200/190	290/280	340/320	500/420
At 29th Street, N.W.	8.9	180	270	310	450
At Valley Freeway (SR-167)	8.0	180/170	270/250	310/280	500/400
At 15th Street, N.W.	7.6	190/170	300/250	370/290	570/480
At Main Street	6.2	160	250	310	490
At Peasley Canyon Way	5.7	140	230	290	450
At 15th Street, N.W.	0.7	--	--	40	--

[1]400 cfs discharge from pump station coincides with peak flows in Green River.
[2]Decrease in discharges due to P-1 pumping plant pumping 300 cfs into Green River during flood stages.

TABLE 1 - SUMMARY OF DISCHARGES (Cont'd)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Big Soos Creek					
At USGS gage 12-112600	66.7	1,130	1,440	1,550	1,790
Below Covington Creek confluence	49.4	870	1,110	1,190	1,380
Above Covington Creek cofnluence	31.2	580	740	800	920
Above Jenkins Creek confluence	13.5	270	350	390	450
Above Little Soos Creek confluence	9.3	200	250	280	320
At S.E. 244th Street	7.1	150	200	220	260
At S.E. 208th Street	4.5	100	130	150	170
White River					
At Pacific and Auburn	440.0	15,870	17,600	18,370	20,700
Sammamish River					
At mouth	240.0	2,300	3,300	4,300	5,600
At Redmond (downstream of Bear Creek)	144.0	1,740	2,480	2,830	3,820
Swamp Creek					
At USGS gage 12-127100	23.1	600	810	910	1,160
At tributary confluence downstream of 73rd Avenue N.E.	21.9	570	770	870	1,110
At N.E. 205th Street	20.9	550	740	830	1,060
North Creek					
Near Bothell (USGS gage No. 12-1260)	24.6	454	581	634	757
Little Bear Creek					
Above Sammamish River confluence	15.6	320[1]	450[1]	500[1]	570[1]
Above SR-202	15.5	340	490	570	750
At Highway 522	14.7	330	480	550	740
At N.E. 205th Street	13.6	310	450	520	700

TABLE 1 - SUMMARY OF DISCHARGES (Cont'd)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Bear Creek					
At Redmond (0.75 mile from mouth)	48.0	1,060	1,365	1,535	2,000
Above Cottage Lake Creek confluence	14.5	320	460	520	690
2,700 feet downstream of USGS gage 12-122500 (at N.E. 133rd Street)	13.9	310	440	500	670
Above Seidal Creek confluence	11.6	260	380	430	570
15 feet downstream of N.E. 145th Street	11.2	250	360	410	550
Above Struve Creek confluence	8.7	200	290	330	450
Above tributary confluence 3,200 feet upstream of N.E. 148th Street	8.0	190	270	310	410
1,500 feet downstream of Woodinville-Duvall Road	7.4	180	250	290	390
At Woodinville-Duvall Road	5.8	140	200	230	310
Evans Creek					
Near Redmond, at R.M.O. 8	13.0	280	360	400	496
Issaquah Creek					
At mouth	55.0	2,580	3,980	4,700	6,700
At USGS gage 12-121000	27.0	1,300	2,050	2,430	3,500
Above West Fork Tributary confluence	21.8	1,080	1,700	2,020	2,910
At Cedar Grove Road	20.5	1,020	1,610	1,910	2,750
1,500 feet downstream of 252nd Avenue S.E.	17.5	880	1,400	1,670	2,400

[1]Downstream discharge decrease results from channel overflows to Sammamish River

TABLE 1 - SUMMARY OF DISCHARGES (Cont'd)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
North Fork Issaquah Creek					
At mouth	4.8	270	425	510	750
East Fork Issaquah Creek					
At mouth	9.5	440	725	850	1,100
Wesk Fork Issaquah Creek					
Above Issaquah Creek confluence	4.9	290	460	550	790
2,900 feet upstream of 229th Drive S.E.	4.7	270	440	530	770
Above tributary confluence near 208th Avenue S.E.	1.5	100	160	200	280
Holder Creek					
Above confluence with Carey Creek	7.5	420	660	800	1,150
Tibbetts Creek					
At mouth	3.9	220	355	425	600
May Creek					
At USGS gage 12-119600	12.7	480	800	870	1,020
At Coal Creek Parkway	8.9	350	580	640	750
At 146th Avenue S.E.	7.7	310	520	560	660
At 148th Avenue S.E.	6.9	280	470	510	600
At 164th Avenue S.E.	4.8	200	340	370	440
At S.E. Renton-Issaquah Road	2.9	130	220	240	280
At S.E. May Valley Road	1.2	59	100	110	130
AT S.E. 109th Place	0.9	46	78	87	100
May Creek Tributary					
Above confluence with May Creek	1.5	72	120	140	160
Vasa Creek					
At mouth	1.37	55	81	93	123
At cross section R	0.53	24	38	44	60

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TABLE 1 - SUMMARY OF DISCHARGES (Cont'd)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Cedar River					
At USGS gage 12-119000	186.0	5,460	7,580	8,530	10,900
Mercer Creek (Including both main and right channel)					
At mouth	17.79	490	628	686	819
At confluence with Kelsey and Richards Creeks	13.75	393	510	560	675
Richards Creek					
At mouth	3.63	122	170	191	241
At Interstate Highway 90	1.11	44	65	75	99
At S.E. Newport Way	0.80	33	50	58	78
Richards Creek West Tributary					
At mouth	0.91	37	55	64	85
Richards Creek East Tributary					
Approximately 325 feet upstream of S.E. 26th Street[1]	0.06	4	36	47	81
Kelsey Creek					
At mouth	10.10	301	398	439	536
At 140th Avenue N.E.	6.69	211	285	317	393
At Lake Hills Boulevard	2.25	84	121	138	179
West Tributary Kelsey Creek					
At mouth	1.75	64	92	104	135
At upstream confluence of East Branch	0.34	16	25	29	41
East Branch of West Tributary (Kelsey Creek)					
At mouth	0.92	37	56	64	86

[1]Includes overflow from Richards Creek for 50-, 100-, and 500-year discharges

TABLE 1 - SUMMARY OF DISCHARGES (Cont'd)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
North Branch Mercer Creek (North Valley Creek)					
At mouth	3.10	111	157	177	227
N.E. 40th Street	1.12	46	69	79	106
Thornton Creek					
Above mouth at Lake Washington	12.1	190	290	390	670
At N.E. 93rd Street	11.7	150	230	330	590
At 45th Avenue N.E.	11.5	140	210	310	560
At N.E. 105th Street	11.1	110	170	260	490
At diversion weir to downstream channel	11.0	100	160	250	480
At diversion to Lake Washington	--	210	330	340	350
Below confluence of North and South Fork Thornton Creeks	10.9	310	490	590	830
North Fork Thornton Creek					
Above South Fork Thornton Creek confluence	7.2	160	270	320	470
Below tributary confluence downstream of N.E. 115th Street	6.8	140	230	280	410
At N.E. 115th Street and 35th Avenue N.E.	5.6	90	150	180	270
At N.E. 125th Street	5.2	67	120	150	240
At 15th Avenue N.E.	4.2	42	82	110	170
At Interstate Highway 5	3.7	32	65	84	140
South Fork Thorton Creek					
At 35th Avenue N.E. and N.E. 105th Street	3.8	150	230	270	380
At 30th Avenue N.E.	3.6	140	210	250	350
At Lake City Way	3.2	120	180	210	300
At N.E. 107th Street	2.1	72	110	130	180
At N.E. 105th Street and 8th Avenue N.E.	1.4	50	75	89	120

TABLE 1 - SUMMARY OF DISCHARGES (Cont'd)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
McAleer Creek					
At mouth	7.80	215	278	304	364
Coal Creek					
At mouth	7.31	228	306	340	420
At Interstate Highway 405	6.76	213	287	320	396
Coal Creek Tributary (Newport Creek)					
At mouth	0.31	14	21	25	35
Forbes Creek					
At mouth	3.7	150	180	220	260
Lyon Creek					
At mouth	3.67	147	177	188	214
Yarrow Creek					
At mouth	2.2	--	--	126	--
At unnamed drainageway in Central Business District	1.5	--	--	339	--
At N.E. 40th Street	0.73	29	44	51	68
Meydenbauer Creek					
At mouth	1.26	44	63	72	93
At S.E. 6th Street	0.19	9	14	16	22
North Fork Meydenbauer Creek					
At 102nd Avenue S.E.	0.93	34	49	56	74
South Fork Skykomish River					
At Skykomish	239.0	25,100	37,400	43,000	57,300
Maloney Creek					
At Skykomish	3.8	750	980	1,130	1,380

TABLE 1 - SUMMARY OF DISCHARGES (Cont'd)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Miller Creek					
Upstream of mouth	8.9	975	1,521	1,805	2,420
Upstream of confluence with Miller Creek-Tributary No. 1	6.8	830	1,276	1,510	2,030
Walker Creek					
Above confluence with Miller Creek	1.5	281	400	461	605
Tolt River					
300 feet above confluence with Snoqualmie River	101.0	10,000	14,000	16,000	20,000
Des Moines Creek					
Below Marine View Drive South	5.8	400	600	702	945
Longfellow Creek					
At S.W. Brandon Street	2.7	170	310	380	520
At 26th Street S.W.	2.5	160	290	350	480
At S.W. Juneau Street	2.2	140	250	310	420
At 25th Avenue S.W.	2.1	130	240	290	400
At S.W. Willow Street	2.0	120	230	280	380
At S.W. Myrtle Street	1.4	84	150	180	250
At S.W. Webster Street (Detention basin outflow)	1.2	76	130	150	220
At S.W. Holden Street	1.1	74	120	140	200
Rolling Hills Creek					
At Highway 405 culvert entrance near Highway 167	1.2	72[1]	861	911	--
Below east storm drain confluence 600 feet upstream of Highway 405	1.2	77	110	130	--
Unnamed Drainageway					
In the central business district in the City of Kirkland	1.5	--	--	339	--

(1) Downstream decrease in discharge results from routing effects of hydraulic structures

McAleer Creek passes through 10 significant hydraulic structures, one private culvert, and numerous private bridges. Lyon Creek passes through 12 significant hydraulic structures. Each of these structures was rated for hydraulic capacity by applying standard hydraulic calculations and hydraulic nomographs (References 53, 54, 55, and 56).

The water-surface elevations for a portion of the upper Green River Valley were computed using the COE G3722110 Water-Surface Profiles computer program (Reference 57).

The water-surface elevations of floods of the selected recurrence intervals on the remaining streams studied by detailed methods were computed using the COE HEC-2 step-backwater computer program (Reference 58).

The starting water-surface elevations for the Snoqualmie River and North, South, and Middle Forks Snoqualmie River, Sammamish River, Tibbetts Creek, and Green River were developed using the slope-area method or were developed from hydraulic rating data. For the most downstream portion of the Green River, the starting water-surface elevation was based on previous studies. The starting water-surface elevation of 6.6 feet, which lies below the highest estimated tide and above the mean high water elevation, was calculated by the COE with the coordination of FEMA Region X.

Starting water-surface elevations for Raging, Cedar, and South Fork Skykomish Rivers, and Big Soos, Swamp, Issaquah, West Fork Issaquah, Thornton, Longfellow, Forbes, Yarrow and Maloney Creeks were determined using normal depth from slope-area methods.

Starting water-surface elevations for Rolling Hills Creek and May Creek were determined to be critical depth. Starting water-surface elevations for May Creek Tributary were the corresponding recurrence interval event water-surface elevations in the main stem at the point of confluence with the tributary.

The starting water-surface elevations for Bear and Evans Creeks are coincident with the elevations at the confluences of the Sammamish River and Bear Creek, respectively.

Starting water-surface elevations for the White River were taken from the COE computer printout and flood profile prepared in 1974 (Reference 40).

The starting water-surface elevation for Lyon Creek and McAleer Creek was the maximum control elevation of Lake Washington, which is 15 feet.

The starting water-surface elevation for North Creek at its mouth was the 10-year flood elevation from the Sammamish River.

Starting water-surface elevations for Little Bear Creek were based on a coincident 25-year recurrence interval Sammamish River flood stage, as was estimated to occur for the January 1986 flooding event. The starting water-surface elevation for Mill Creek (Auburn) was based on computed Green River backwater elevations at the Mill Creek outlet using mean monthly Green River flow data for December and January.

The starting water-surface elevation on Mill Creek (Kent) was obtained from the Springbrook Creek flood profile.

Starting water-surface elevations for the flood profiles for Miller Creek and Walker Creek were taken from the hydraulic study of Puget Sound. Starting elevations for the flood profiles for Des Moines Creek were taken using the 10-year elevation computed for Puget Sound.

For the coastal area studied by detailed methods, the effects of high tidal levels and wave runup were combined to determine the maximum flood elevations above the NGVD of 1929 datum. Wave prediction and wave runup calculations were performed by methods prescribed in the COE Shore Protection Manual (Reference 59).

Starting water-surface elevations for Mercer, Right Channel Mercer, Meydenbauer, North Fork Meydenbauer, Coal, Vasa, Richards, East Tributary Richards, West Tributary Richards, Kelsey, West Tributary Kelsey, East Branch of West Tributary Kelsey, and North Branch Mercer Creeks were computed from:

1. Frequency analysis of lake elevations
2. Profile conveyance of downstream cross sections
3. Culvert ratings where an approach section was the section farthest downstream

The starting water-surface elevations for the Black River, North and East Forks Issaquah Creek, and North and South Forks Thornton Creek are coincident with the elevations at the confluences of the Green River, Issaquah Creek, and Thornton Creek, respectively.

For the Green River, analyses were performed in accordance with FEMA's levee policy. In accordance with those guidelines, two backwater profiles were computed for the reach under study, one for flows confined to the levee system, and a second for the condition of complete levee systems assumed removed for analysis, where levee system freeboard is less than minimum FEMA standards. The general freeboard standard of 3.0 feet for consideration of levee flood protection was lowered by FEMA for the Green River to 2.0 feet based on COE review and recommendations, at the request of King County (Reference 60). Based on the computed with levees water-surface profiles and surveyed cross section and levee profile data, a total of approximately 5.7 river miles of levees were identified as having less than 2.0 feet of freeboard at some locations along a particular levee system.

On Little Bear Creek, high water marks for the January 1986 event were used to calculate flows through culverts and to reduce flows at overbank breakout points, from upstream of the SR 202 culvert, downstream to the Sammamish River confluence. The HEC-2 step-backwater model was calibrated to these conditions. A range of flows were input to the model to develop rating curves for the structures and overflow weirs. The recurrence flows, derived from the hydrologic analyses, were modified to reflect the overflow conditions from review of the rating curves. Sheetflow and ponding caused by the channel overflow was approximated from photographs, topographic maps, high water marks, and local accounts of flooding extent and depths.

The maximum water-surface elevation of the P1 storage pond in Renton was determined by routing the hydrograph through the storage pond and pumping station by using the storage-elevation relationship for the pond and the pumping station's firm capacity of 875 cfs as the maximum discharge. The 10-year water-surface profile for Springbrook Creek was started at normal depth because normal depth was greater than 3.5 feet NGVD, which is the maximum water-surface elevation of the P1 storage pond under standard operating procedures. The peak 10-year flow into the storage pond is less than the maximum pumping rate and, therefore, no rise in the water-surface elevation of the storage pond should occur during the 10 year event. Two conditions were considered for each of the 50- and 100-year events. The first consisted of modeling the effects on the Springbrook Creek study reach of the computed maximum water-surface elevation that may be reached in the storage pond (the starting water-surface elevation) coincident with the flow that would be discharged from Springbrook Creek at that time step in the inflow runoff hydrograph. The second condition of analysis consisted of modeling the effects of Springbrook Creek peak inflows for the recurrence interval event under consideration, with a starting water-surface elevation of the higher of normal depth, or the coincident elevation of the storage pond at the time of the peak inflow. For each recurrence interval, the higher water-surface elevation resulting from each of those analysis conditions at the study reach cross sections was used for final flood profile determination.

The COE regulates the water level of Lake Washington at the Hiram M. Chittenden Locks on the Lake Washington Ship Canal. The lake level is drawn down during the winter months and is typically regulated at elevation 13.2 NGVD for that period.

In the summer months, the lake level is raised to an elevation of 15.0 feet NGVD. That elevation exceeds the normal depth water-surface elevation determined at the mouth of the Cedar River for the 10-, 50-, and 100-year recurrence interval flows. Therefore, the flood profiles for the Cedar River includes the backwater impact from Lake Washington until the profile that was started at normal depth exceeds the 15.0-foot elevation for the 100-year recurrence interval event at the first cross section, with lake backwater shown for the lesser recurrence intervals.

For the coastal areas studied by detailed methods near Des Moines and Normandy Park, the effects of high tidal levels and wave runup were combined to determine the maximum flood elevations. Wave prediction and wave runup calculations were performed by methods prescribed in the COE Shore Protection Manual (Reference 59) and wave runup elevations for the 10-, 50-, 100-, and 500-year conditions for Puget Sound north of and outside the breakwater of Des Moines Marina, and the 100-year condition for unprotected areas south of Des Moines Marina are shown in Table 2, "Summary of Elevations."

Table 2 - Summary of Elevations

Flooding Source and Location	Elevation in Feet (NGVD) 10-Year	50-Year	100-Year	500-Year
Puget Sound				
Area from northwest corporate limits of Normandy Park to confluence with Miller Creek	10.2	13.5	16.3	16.7
Area from confluence with Miller Creek to vicinity of Shorebrook Drive	8.3	8.9	9.1	9.5
Area from vicinity of Shorebrook Drive to vicinity of SW Shoremont Avenue	10.2	13.5	16.3	16.7
Area from vicinity of SW Shoremont Avenue to just south of Normandy Park Creek	8.6	9.6	10.1	10.5
Area from just south of Normandy Park Creek to vicinity of SW 201st Street extended	10.2	13.5	16.3	16.7
Area from vicinity of SW 201st Street extended to vicinity of SW 202nd Street extended	8.3	8.9	9.1	9.5
Area from vicinity of SW 202nd Street extended to vicinity of SW 203rd Street extended	8.6	9.6	10.1	10.5
Area from vicinity of SW 203rd Street extended to vicinity of SW 207th Street extended	10.2	13.5	16.3	16.7

Table 2 - Summary of Elevations (Cont'd)

Flooding Source and Location	Elevation in Feet (NGVD) 10-Year	50-Year	100-Year	500-Year
Area in the vicinity of SW 207th Street extended	8.6	9.6	10.1	10.5
Area from vicinity of SW 207th Place extended to Normandy Park-Des Moines corporate limits	10.2	13.5	16.3	16.7
Unprotected Area North of Des Moines Marina and Area Outside the Breakwater	10.2	13.5	16.3	16.7
Protected Area Within the Breakwater and Area Shadowed by the Breakwater	8.3	8.9	9.1	9.5
Unprotected Area South of Des Moines Marina	8.3	8.9	9.1/12.7[1]	9.5
Lake Sammamish	29.0	31.3	32.5	34.0

[1]Stillwater Elevation/Wave Runup Elevation

Areas of coastline subject to wave attack are referred to as coastal high hazard zones. Factors considered in determining wave runup included length of fetch, sustained wind velocities, coastal water depths, land slopes, and other physical features of the coastline that could appreciably affect wave propagation. Much of the coastline along Des Moines is protected by a breakwater that extends north and south along the coast to protect the Des Moines Marina. The area west of this breakwater and the unprotected area north and south of the breakwater have been designated coastal high hazard zones. The unprotected sections of the coastline are subject to wave attack generated by high winds from a southwest direction across Puget Sound. The remaining coastal areas inland from the breaking waves, subject only to wave runup, and areas sheltered by the breakwater are not exposed to severe wave attack and have not been designated as part of a coastal high hazard zone.

Elevations on Lake Sammamish for the various frequency floods are controlled by the COE Lake Sammamish outlet project built in 1966. This project consists of a low weir designed to maintain the lake elevation at 29.0 feet for the 10-year flood. The elevations for the 50-, 100-, and 500-year floods were computed by routing techniques through the lake. Elevations for floods for the selected recurrence intervals are also presented in Table 2.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and floodplain areas, and hydraulic calibration of flood profiles to available high water mark data. The range of channel and overbank "n" values for the various flooding sources are listed in Table 3.

Table 3 - Manning's "n" Values

Stream	Channel "n" Range	Overbank "n" Range
Snoqulmie River (Main Stem and Forks)	0.028-0.058	0.040-0.170
Raging River	0.065-0.080	0.080
Green River	0.020-0.055	0.060-0.300
Black River/Springbrook Creek	0.011-0.050	0.050-0.150
Mill Creek (Auburn)	0.012-0.090	0.045-0.095
Mill Creek (Kent)	0.012-0.041	0.050-0.120
Big Soos Creek	0.024-0.090	0.040-0.150
White River	0.02 .057	0.040-0.085
Sammamish River	0.026 057	0.040-0.140
Swamp Creek	0.045- 85	0.050-0.120
North Creek	0.030-0.055	0.050-0.100
Little Bear Creek	0.012-0.080	0.016-0.150
Bear Creek	0.040-0.100	0.060-0.300
Evans Creek	0.039-0.063	0.056-0.135
Issaquah Creek	0.030-0.055	0.020-0.120
North Fork Issaquah Creek	0.026-0.055	0.070-0.120
West Fork Issaquah Creek	0.024-0.050	0.035-0.120
East Fork Issaquah Creek	0.050	0.130
Holder Creek	0.030-0.055	0.020-0.120
Tibbetts Creek	0.027-0.055	0.080-0.130
May Creek	0.030-0.090	0.055-0.150
May Creek Tributary	0.040	0.070
Vasa Creek	0.035-0.042	0.055-0.075
Cedar River	0.020-0.055	0.033-0.150
Mercer Creek	0.035-0.042	0.055-0.075
Right Channel Mercer Creek	0.035-0.042	0.055-0.075
Richards Creek	0.035-0.042	0.055-0.075
Richards Creek West Tributary	0.035-0.042	0.055-0.075
Richards Creek East Tributary	0.035-0.042	0.055-0.075
Kelsey Creek	0.035-0.042	0.055-0.075
West Tributary Kelsey Creek	0.035-0.042	0.055-0.075
East Branch of West Tributary Kelsey Creek	0.035-0.042	0.055-0.075
North Branch Mercer Creek	0.035-0.042	0.055-0.075
Thornton Creek	0.012-0.045	0.028-0.120
North Fork Thornton Creek	0.012-0.045	0.028-0.120
South Fork Thornton Creek	0.012-0.045	0.028-0.120
McAleer Creek	0.025-0.050	0.013-0.080
Coal Creek	0.035-0.042	0.055-0.075

Table 3 - Manning's "n" Values (Cont'd)

Stream	Channel "n" Range	Overbank "n" Range
Forbes Creek	0.045	0.050
Lyon Creek	0.025	0.050
Yarrow Creek	0.045	0.150
Meydenbauer Creek	0.035-0.042	0.055-0.075
North Fork Meydenbauer Creek	0.035-0.042	0.055-0.075
Tolt River	0.015-0.600	0.035-0.600
South Fork Skykomish River	0.038-0.042	0.060-0.125
Maloney Creek	0.037-0.055	0.050-0.100
Miller Creek	0.040-0.050	0.060-0.120
Walker Creek	0.050	0.060-0.120
Des Moines Creek	0.030-0.040	0.050-0.100
Longfellow Creek	0.025-0.065	0.065-0.070
Rolling Hills Creek	0.025-0.040	0.020-0.060

Flood profiles were computed to an accuracy of approximately 1.0 foot for floods of the selected recurrence intervals and are shown in Exhibit 1. The degree of accuracy of the water-surface profiles is limited to 1.0 foot by the location and accuracy of the cross sections, the extent of the various energy losses of the system, and the general limitations of backwater calculations. The accuracy of 1.0 foot is consistent with the accuracy of predicted peak discharges and the knowledge that unpredictable events during actual floods will likely cause deviations from the predicted profile.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (see Section 4.2), selected cross section locations are also shown on the Flood Insurance Rate Maps (Exhibit 2).

For streams studied by approximate methods, the 100-year floodplains were approximated by field inspections and observations and by normal depth calculation using estimated 100-year recurrence interval floodflows and approximate cross sections taken from field investigations or from topographic maps, where available. Computed depth from minimum channel elevation and average floodflow velocity are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the NGVD of 1929. Elevation reference marks used in this study are shown on the maps; the description of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities and counties in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated. using topographic maps at scales of 1:240, 1:1,200, 1:2,400, 1:4,800, and 1:6,000, with contour intervals of 1, 2, 4, 5, and 10 feet (References 46 and 63 to 78).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO and VE); and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 7).

Approximate 100-year floodplain boundaries in some portions of the study area were taken directly from Flood Hazard Boundary Maps (References 79 to 89), or Flood Insurance Rate Maps (References 90 and 91).

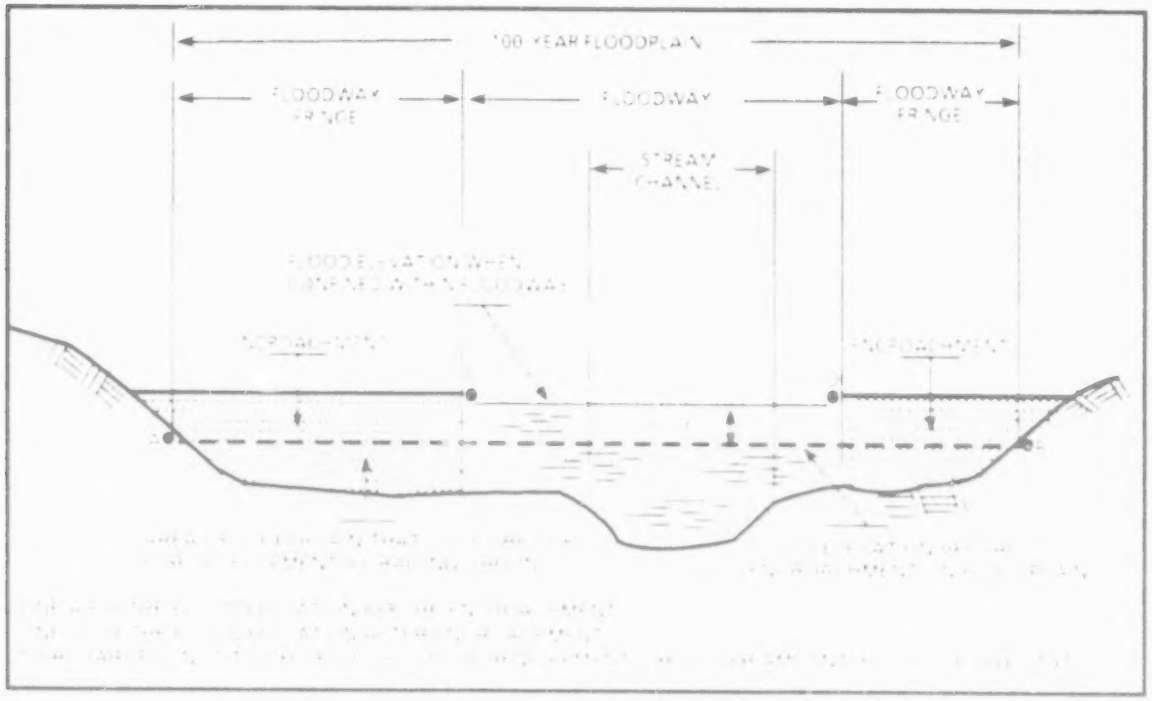
4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain

management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodways widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated at selected cross sections (Table 4). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown Figure 2.



FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Snoqualmie River								
A	6.50	4,762	48,310	1.8	43.0	43.0	43.8	0.8
B	9.80	3,273	25,877	3.4	44.7	44.7	45.5	0.8
C	11.40	3,366	28,797	2.3	46.4	46.4	47.3	0.9
D	14.70	2,646	16,553	3.1	49.4	49.4	50.2	0.8
E	16.65	3,151	27,176	2.5	51.5	51.5	52.4	0.9
F	18.80	4,453	26,323	3.7	54.0	54.0	54.9	0.9
G	19.90	3,014	25,071	2.8	55.2	55.2	56.1	0.9
H	21.15	1,467	20,888	2.5	56.0	56.0	57.0	1.0
I	24.30	1,044	11,930	4.8	68.6	68.6	69.2	0.6
J	25.10	1,577	18,355	3.7	74.7	74.7	75.1	0.4
K	26.90	4,678	55,633	3.1	77.1	77.1	77.7	0.6
L	28.55	4,330	44,702	1.9	77.7	77.7	78.3	0.6
M	30.70	4,451	35,057	2.7	79.5	79.5	80.2	0.7
N	33.10	3,581	27,294	2.7	82.0	82.0	82.9	0.9
O	35.10	3,025	24,466	3.2	88.2	88.2	89.1	0.9
P	36.20	1,498	16,200	3.1	94.3	94.3	95.3	1.0
Q	36.80	1,564	17,259	4.7	99.0	99.0	99.7	0.7
R	38.60	415	7,007	4.3	108.5	108.5	108.9	0.4
S	40.00	320	3,795	15.5	126.1	126.1	126.1	0.0
T	40.42	283	4,593	17.4	413.0	413.0	413.0	0.0
U	40.66	568	9,384	8.5	419.3	419.3	419.3	0.0
V	40.72	890	13,024	6.1	420.0	420.0	420.0	0.0
W	40.94	1,618	17,979	4.4	421.2	421.2	421.2	0.0
X	41.19	2,340	16,674	4.8	421.9	421.9	421.9	0.0
Y	41.34	2,580	32,581	2.5	422.0	422.0	422.8	0.8

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

SNOQUALMIE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Snoqualmie River (Cont'd)								
Z	41.68	4,430	55,821	1.4	422.4	422.4	422.4	0.0
AA	42.00	5,110	60,389	1.3	422.7	422.7	423.7	1.0
AB	42.19	5,356	49,249	1.6	422.9	422.9	423.9	1.0
AC	42.51	4,529	44,191	1.8	423.4	423.4	424.4	1.0
AD	42.80	4,120	53,662	1.5	423.7	423.7	424.7	1.0
AE	43.20	1,927	18,266	2.7	423.9	423.9	424.7	0.8
AF	43.90	1,270	14.928	4.0	425.3	425.3	426.1	0.8
AG	44.70	3,600	20,589	2.4	426.7	426.7	427.6	0.9

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

SNOQUALMIE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	AREA (SQUARE FEET)	SECTION WIDTH (INCLUDING ISLETS) (FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Raging River						(FEET NGVD)		
A	24,400	81	506	7.8	425.6	425.6	426.0	0.4
B	25,360	71	448	8.8	437.8	437.8	437.8	0.0
C	25,925	69	430	9.2	445.5	445.5	446.1	0.6
D	26,140	63	428	9.2	449.1	449.1	449.6	0.5
E	26,205	97	842	4.7	451.7	451.7	452.0	0.3
F	27,460	94	357	11.1	464.0	464.0	464.6	0.6
G	28,160	73	485	8.2	478.8	478.8	479.4	0.6
H	28,860	112	461	8.6	489.4	489.4	490.3	0.9
I	29,680	99	494	8.0	502.8	502.8	503.8	1.0
J	30,450	142	589	6.7	514.7	514.7	515.5	0.8
K	31,320	188	680	5.8	525.0	525.0	526.0	1.0
L	32,160	134	528	7.5	535.7	535.7	535.7	0.0
M	32,930	148	675	4.8	543.2	543.2	544.2	1.0
N	33,750	122	346	9.3	554.3	544.3	544.3	0.0
O	34,960	73	487	6.6	569.8	569.8	570.8	1.0
P	35,700	59	266	12.1	581.4	581.4	581.6	0.2
Q	36,560	64	470	6.8	593.7	593.7	594.7	1.0
R	37,160	104	319	10.0	603.7	603.7	603.7	0.0
S	37,790	76	458	7.0	615.0	615.0	615.8	0.8
T	37,990	68	405	7.9	617.1	617.1	617.9	0.8
U	38,100	95	480	6.7	618.8	618.8	619.3	0.5
V	38,520	55	340	9.4	624.4	624.4	624.4	0.0
W	39,180	61	402	8.0	633.5	633.5	634.0	0.5
X	39,600	70	252	8.9	641.4	641.4	641.4	0.0
Y	39,800	176	513	4.3	645.4	645.4	646.1	0.7

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

RAGING RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Raging River (Cont'd)								
Z	39,865	64	398	5.6	646.5	646.5	647.0	0.5
AA	40,560	65	263	8.5	653.4	653.4	653.7	0.3
AB	41,010	56	283	7.9	662.2	662.2	662.3	0.1
AC	41,640	81	311	7.2	672.8	672.8	672.9	0.1

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

RAGING RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	AREA	MEAN VELOCITY	MEAN VELOCITY	REGULATORY	WITHOUT	WITH	INCREASE
Middle Fork Snoqualmie River								
AH	45.06	1,720	18,757	1.7	427.2	427.2	427.3	0.1
AI	45.30	2,500	17,495	2.7	427.8	427.8	427.9	0.1
AJ	45.60	2,680	12,070	3.1	428.7	428.7	428.9	0.2
AK	45.90	1,920	5,165	4.3	431.3	431.3	431.6	0.3
AL	46.08	1,820	7,129	5.6	435.0	435.0	435.4	0.4
AM	46.25	2,040	7,032	5.6	438.4	438.4	438.9	0.5
AN	46.61	1,580	6,702	7.9	446.5	446.5	446.9	0.4
AO	46.89	1,910	6,316	5.8	453.1	453.1	453.5	0.4
AP	47.10	2,110	6,738	5.6	457.9	457.9	458.4	0.5
AQ	47.25	2,170	10,373	4.1	461.7	461.7	462.2	0.5
AR	47.40	2,545	10,999	3.4	463.1	463.1	463.6	0.5
AS	47.60	580	3,819	6.6	471.0	471.0	471.0	0.0
AT	47.93	230	2,826	12.7	480.7	480.7	480.7	0.0
AU	47.98	248	2,695	13.3	483.0	483.0	483.0	0.0
AV	48.06	207	2,359	15.2	484.1	484.1	484.1	0.0
AW	48.16	304	3,533	10.2	489.9	489.9	489.9	0.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MIDDLE FORK SNOQUALMIE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
North Fork Snoqualmie River								
A	0.46	1,800	7,075	4.1	427.5	427.5	428.5	1.0
B	0.56	1,600	8,082	2.8	427.9	427.9	428.8	0.9
C	0.64	1,700	6,116	4.5	428.3	428.3	429.3	1.0
D	0.73	1,500	4,052	5.4	428.9	428.9	429.9	1.0
E	0.83	1,340	4,655	4.5	429.6	429.6	430.6	1.0
F	0.95	1,300	4,422	4.8	431.0	431.0	431.7	0.7

¹Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

NORTH FORK SNOQUALMIE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
South Fork Snoqualmie River (With Levees)								
A	0.80	700	10,200	2.4	426.7	426.7	426.7	0.0
B	1.04	1,649	5,085	2.9	426.0	420.6[2]	421.6[2]	1.0
C	1.44	1,261	5,486	2.7	427.3	427.3	427.8	0.5
D	1.68	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
E	1.82	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
F	1.89	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
G	2.03	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
H	2.13	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
I	2.26	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
J	2.35	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
K	2.64	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
L	2.8[illegible]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
M	2.95	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
N	3.15	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
O	3.36	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]
P	[illegible].70	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]	--[3]

[1]Miles Above Mouth [2]Elevations Computed Without Consideration of Backwater Effect from Snoqualmie River

[3]Floodway Computed Without Consideration of Left Overbank Levee

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH FORK SNOQUALMIE RIVER (WITH LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
South Fork Snoqualmie River (Without Consideration of Left Overbank Levee)								
A	0.80	700	10,200	3.4	426.7	426.7	426.7	0.0
B	1.04	1,649	5,085	2.9	426.0	420.6[2]	421.6[2]	1.0
C	1.44	1,261	5,486	3.7	427.3	427.3	427.8	0.5
D	1.68	1,112	4,774	4.1	428.6	428.6	429.4	0.8
E	1.82	1,118	4,396	4.0	429.6	429.6	430.6	1.0
F	1.89	965	3,974	3.8	429.9	429.9	430.9	1.0
G	2.04	1,200	4,541	3.3	432.1	432.1	432.1	0.0
H	2.13	1,400	5,222	2.9	433.6	433.6	434.3	0.7
I	2.26	917	2,891	5.2	434.8	434.8	435.4	0.6
J	2.35	1,032	3,025	5.0	436.7	436.7	437.3	0.6
K	2.64	408	999	5.0	438.5	438.5	439.5	1.0
L	2.83	612	1,672	5.0	444.4	444.4	444.4	0.0
M	2.95	656	2,434	5.0	445.0	445.0	445.3	0.3
N	3.15	250	1461	10.3	445.5	445.5	446.3	0.8
O	3.36	251	1,812	8.3	449.1	449.1	449.4	0.3
P	3.70	350	2,139	6.9	452.5	452.5	453.4	0.9

[2] Miles Above Mouth [3] Feet Above Confluence of South Fork Snoqualmie River and Middle Fork Snoqualmie River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH FORK SNOQUALMIE RIVER (WITHOUT CONSIDERATION OF LEFT OVERBANK LEVEE)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Green River (Without Levees)								
A	3.90	450	9,977	1.2	8.2	8.2	8.2	0.0
B	4.38	443	8,939	1.3	8.3	8.3	8.3	0.0
C	4.80	500	9,357	1.3	8.3	8.3	8.3	0.0
D	5.21	800	13,904	0.9	8.3	8.3	8.3	0.0
E	5.42	400	4,953	2.4	8.3	8.3	8.3	0.0
F	5.68	260	3,626	3.3	8.5	8.5	8.5	0.0
G	5.98	290	4,571	2.6	8.7	8.7	8.7	0.0
H	6.20	400	4,679	2.6	8.8	8.8	8.8	0.0
I	6.25	200	2,726	4.4	8.8	8.8	8.8	0.0
J	7.62	213	2,432	5.3	9.9	9.9	9.9	0.0
K	8.12	250	2,668	4.8	11.4	11.4	11.4	0.0
L	8.47	290	3,555	3.6	12.3	12.3	12.3	0.0
M	8.86	190	2,464	5.2	13.0	13.0	13.0	0.0
N	8.97	186	2,363	5.4	13.3	13.3	13.3	0.0
O	9.06	165	2,051	6.2	13.5	13.5	13.5	0.0
P	9.24	188	2,883	4.4	14.2	14.2	14.2	0.0
Q	9.48	134	2,645	4.8	14.4	14.4	14.5	0.1
R	10.63	176	2,654	4.8	17.5	17.5	17.6	0.1
S	10.79	163	3,247	3.9	18.1	18.1	18.2	0.1
T	10.87	163	2,735	4.7	18.3	18.3	18.4	0.1
U	10.92	216	3,576	3.6	18.6	18.6	18.8	0.2
V	11.18	150	2,571	4.7	19.4	19.4	19.5	0.1
W	11.48	140	2,576	4.7	20.0	20.0	20.2	0.2
X	11.68	180	2,884	4.2	20.3	20.3	20.6	0.3
Y	11.83	175	2,568	4.7	20.6	20.6	21.0	0.4

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITHOUT LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Green River (Without Levees) Cont'd								
Z	12.02	180	3,082	3.9	21.1	21.1	21.5	0.4
AA	12.23	215	3,701	3.3	21.5	21.5	21.8	0.3
AB	12.39	137	2,546	4.8	21.6	21.6	21.9	0.3
AC	12.60	185	3,076	3.9	22.4	22.4	22.7	0.3
AD	12.72	183	3,023	4.0	22.7	22.7	23.0	0.3
AE	12.91	168	3,103	3.9	23.2	23.2	23.5	0.3
AF	13.07	175	3,015	4.0	23.5	23.5	23.8	0.3
AG	13.20	174	2,999	4.0	23.8	23.8	24.1	0.3
AH	13.38	166	2,720	4.4	24.2	24.2	24.4	0.2
AI	13.52	209	3,137	3.9	24.6	24.6	24.8	0.2
AJ	13.70	128	2,512	4.8	25.0	25.0	25.2	0.2
AK	13.93	139	2,581	4.7	25.4	25.4	25.6	0.2
AL	14.18	160	2,661	4.5	25.8	25.8	26.2	0.4
AM	14.46	152	2,856	4.2	26.3	26.3	26.8	0.5
AN	14.48	163	2,821	4.3	26.3	26.3	26.8	0.5
AO	14.68	141	2,463	4.9	26.6	26.6	27.2	0.6
AP	14.90	152	2,660	4.5	27.2	27.2	27.7	0.5
AQ	14.94	179	2,844	4.3	27.3	27.3	27.8	0.5
AR	15.14	155	3,017	4.0	27.6	27.6	28.2	0.6
AS	15.39	142	2,679	4.5	27.9	27.9	28.6	0.7
AT	15.73	161	3,112	3.9	28.2	28.2	29.1	0.9
AU	16.01	185	3,381	3.6	28.6	28.6	29.5	0.9
AV	16.33	174	2,735	4.4	29.1	29.1	30.0	0.9
AW	16.54	175	3,193	3.8	29.6	29.6	30.4	0.8

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITHOUT LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Green River (Without Levees Cont'd)								
AX	16.76	196	3,561	3.4	29.9	29.9	30.7	0.8
AY	16.94	165	2,815	4.3	30.1	30.1	30.9	0.8
AZ	17.15	151	2,864	4.2	30.5	30.5	31.2	0.7
BA	17.36	158	2,773	4.4	30.9	30.9	31.6	0.7
BB	17.56	167	2,913	4.2	31.3	31.3	31.9	0.6
BC	17.77	161	2,633	4.6	31.7	31.7	32.3	0.6
BD	17.99	176	2,868	4.2	32.3	32.3	32.9	0.6
BE	18.10	182	3,061	4.0	32.7	32.7	33.2	0.5
BF	18.44	192	3,148	3.8	33.1	33.1	33.6	0.5
BG	18.74	186	2,318	4.3	33.6	33.6	34.0	0.4
BH	18.94	183	3,247	3.7	34.1	34.1	34.5	0.4
BI	19.18	162	2,859	4.2	34.4	34.4	34.8	0.4
BJ	19.35	206	2,993	4.0	34.7	34.7	35.1	0.4
BK	19.51	176	3,088	3.9	35.1	35.1	35.4	0.3
BL	19.75	176	3,042	4.0	35.4	35.4	35.7	0.3
BM	20.01	202	3,664	3.3	35.8	35.8	36.1	0.3
BN	20.24	186	3,297	3.7	36.1	36.1	36.4	0.3
BO	20.47	179	3,219	3.8	36.4	36.4	36.7	0.3
BP	20.68	171	3,044	4.0	36.6	36.6	36.9	0.3
BQ	20.87	167	3,141	3.9	36.9	36.9	37.2	0.3
BR	20.99	152	2,869	4.2	37.1	37.1	37.4	0.3
BS	21.23	188	2,977	4.1	37.5	37.5	37.7	0.2
BT	21.38	199	3,262	3.7	37.8	37.8	38.0	0.2
BU	21.62	176	3,034	4.0	38.1	38.1	38.3	0.2

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITHOUT LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Green River (Without Levees Cont'd)								
BV	21.91	147	2,735	4.4	38.6	38.6	38.8	0.2
BW	22.11	149	2,931	4.1	39.0	39.0	39.2	0.2
BX	22.38	184	2,993	4.0	39.4	39.4	39.6	0.2
BY	22.59	171	3,085	3.9	39.7	39.7	39.9	0.2
BZ	22.88	179	3,128	3.9	40.1	40.1	40.3	0.2
CA	23.10	197	3,146	3.8	40.4	40.4	40.6	0.2
CB	23.27	197	3,206	3.8	40.7	40.7	40.9	0.2
CC	23.53	184	3,067	3.9	41.2	41.2	41.4	0.2
CD	23.71	168	2,948	4.1	41.5	41.5	41.7	0.2
CE	23.89	175	3,026	4.0	41.9	41.9	42.1	0.2
CF	24.06	171	2,899	4.1	42.2	42.2	42.4	0.2
CG	24.10	147	2,576	4.7	42.2	42.2	42.4	0.2
CH	24.30	156	2,595	4.6	42.7	42.7	42.9	0.2
CI	24.44	154	2,735	4.4	43.0	43.0	43.2	0.2
CJ	24.63	147	2,517	4.8	43.3	43.3	43.5	0.2
CK	24.89	175	2,601	4.6	43.8	43.8	43.9	0.1
CL	25.12	160	3,202	3.7	44.2	44.2	44.4	0.2
CM	25.14	205	2,903	4.1	44.2	44.2	44.4	0.2
CN	25.30	155	2,596	4.6	44.5	44.5	44.6	0.1
CO	25.62	150	2,837	4.2	45.0	45.0	45.1	0.1
CP	25.90	167	2,762	4.3	45.4	45.4	45.5	0.1
CQ	26.15	223	2,909	4.1	46.0	46.0	46.1	0.1
CR	26.44	159	2,774	4.3	46.6	46.6	46.7	0.1
CS	26.68	265	3,828	3.1	47.1	47.1	47.2	0.1

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITHOUT LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Green River (Without Levees) Cont'd								
CT	26.93	248	2,982	4.0	47.4	47.4	47.5	0.1
CU	27.15	202	3,156	3.8	47.8	47.8	47.9	0.1
CV	27.36	211	3,695	3.2	48.2	48.2	48.3	0.1
CW	27.60	148	2,168	5.5	48.3	48.3	48.4	0.1
CX	27.88	216	3,168	3.8	49.3	49.3	49.4	0.1
CY	28.04	127	2,019	5.9	49.5	49.5	49.5	0.0
CZ	28.24	156	2,119	5.7	49.8	49.8	50.3	0.5
DA	28.43	118	1,701	7.1	50.6	50.6	51.1	0.5
DB	28.68	162	2,123	5.7	52.1	52.1	52.5	0.4
DC	28.87	150	1,918	6.3	52.6	52.6	52.9	0.3
DD	29.03	171	2,081	5.8	53.3	53.3	53.6	0.3
DE	29.25	159	1,891	6.3	54.0	54.0	54.2	0.2
DF	29.45	184	2,019	5.9	54.8	54.8	55.1	0.3
DG	29.73	160	1,857	6.5	55.9	55.9	56.1	0.2
DH	29.94	166	1,723	7.0	56.9	56.9	57.1	0.2
DI	30.21	217	1,871	6.4	58.5	58.5	58.6	0.1
DJ	30.39	158	1,532	7.8	59.3	59.3	59.4	0.1
DK	30.59	237	1,948	6.1	61.0	61.0	61.0	0.0
DL	30.81	309	2,538	4.7	62.1	62.1	62.1	0.0
DM	30.98	182	1,696	7.1	62.4	62.4	62.4	0.0
DN	31.07	126	1,900	6.3	62.9	62.9	62.9	0.0
DO	31.28	185	1,891	6.3	63.6	63.6	63.7	0.1
DP	31.58	151	1,971	6.1	64.7	64.7	64.7	0.0
DQ	31.90	126	1,642	7.3	65.8	65.8	65.8	0.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITHOUT LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Green River (Without Levees) Cont'd								
DR	32.25	185	2,131	5.6	67.4	67.4	67.8	0.4
DS	32.58	1,247	6,579	1.8	68.5	68.5	69.1	0.6
DT	32.85	1,512	6,846	1.8	69.2	69.2	69.6	0.4
DU	33.10	841	4,091	2.9	69.8	69.8	70.2	0.4
DV	33.33	542	2,956	4.1	70.7	70.7	71.0	0.3
DW	33.55	225	1,924	6.2	72.0	72.0	72.9	0.9
DX	33.72	271	2,175	5.5	73.3	73.3	74.1	0.8
DY	33.78	180	1,808	6.6	73.7	73.7	74.4	0.7
DZ	33.82	265	2,294	5.2	74.4	74.4	75.0	0.6
EA	33.38	225	2,010	6.0	74.8	74.8	75.1	0.3
EB	34.18	212	1,484	7.8	76.7	76.7	77.0	0.3
EC	34.64	208	1,644	7.1	80.0	80.0	80.8	0.8
ED	35.00	256	1,891	6.1	83.3	83.3	83.4	0.1
EE	35.30	200	1,610	7.2	84.9	84.9	84.9	0.0
EF	35.74	237	1,846	6.3	87.9	87.9	87.9	0.0
EG	36.08	314	1,891	6.1	90.6	90.6	90.6	0.0
EH	36.33	231	1,415	8.2	92.7	92.7	92.8	0.1
EI	36.78	234	2,093	5.5	97.4	97.4	98.2	0.8
EJ	37.17	336	2,254	5.1	100.5	100.5	100.9	0.4
EK	37.48	574	2,863	4.1	103.2	103.2	103.5	0.3
EL	37.71	621	2,574	4.5	105.0	105.0	105.4	0.4
EM	38.23	648	2,489	4.7	110.3	110.3	111.3	1.0
EN	38.52	287	1,697	6.8	114.5	114.5	115.3	0.8
EO	38.94	329	2,265	5.1	120.3	120.3	121.3	1.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITHOUT LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Green River (Without Levees)								
EP	39.18	735	3,567	3.3	123.1	123.1	123.4	0.3
EQ	39.55	905	3,077	3.8	125.6	125.6	126.1	0.5
ER	40.16	482	1,926	6.0	135.5	135.5	136.5	1.0
ES	40.33	202	1,415	8.2	139.1	139.1	139.7	0.6
ET	40.83	278	1,780	6.5	148.9	148.9	148.8	0.0
EU	41.08	370	1,426	8.1	153.0	153.0	153.2	0.2
EV	41.44	225	1,593	7.2	159.5	159.5	160.1	0.6
EW	41.76	330	1,687	6.8	165.5	165.5	165.7	0.2
EX	41.90	220	1,552	7.4	167.6	167.6	167.7	0.1
EY	42.14	201	1,485	7.7	170.8	170.8	170.9	0.1
EZ	42.40	261	1,268	9.1	176.6	176.6	176.6	0.0
FA	42.78	186	1,242	9.3	187.6	187.6	187.6	0.0
FB	43.29	310	1,848	6.2	197.0	197.0	197.0	0.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITHOUT LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[3] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[4]	WITHOUT[4] FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Green River (With Levees) A-U[2]								
V	11.18	--[3]	--[3]	--[3]	19.4	19.4	--[3]	--[3]
W	11.48	--[3]	--[3]	--[3]	20.0	20.0	--[3]	--[3]
X	11.68	--[3]	--[3]	--[3]	20.5	20.5	--[3]	--[3]
Y	11.83	--[3]	--[3]	--[3]	20.8	20.8	--[3]	--[3]
Z	12.02	--[3]	--[3]	--[3]	21.4	21.4	--[3]	--[3]
AA	12.23	--[3]	--[3]	--[3]	21.7	21.7	--[3]	--[3]
AB	12.39	--[3]	--[3]	--[3]	21.8	21.8	--[3]	--[3]
AC	12.60	--[3]	--[3]	--[3]	22.6	22.6	--[3]	--[3]
AD	12.72	--[3]	--[3]	--[3]	22.9	22.9	--[3]	--[3]
AE	12.91	--[3]	--[3]	--[3]	23.4	23.4	--[3]	--[3]
AF	13.07	--[3]	--[3]	--[3]	23.7	23.7	--[3]	--[3]
AG	13.20	--[3]	--[3]	--[3]	23.9	23.9	--[3]	--[3]
AH	13.38	--[3]	--[3]	--[3]	24.4	24.4	--[3]	--[3]
AI	13.52	--[3]	--[3]	--[3]	24.8	24.8	--[3]	--[3]
AJ	13.70	--[3]	--[3]	--[3]	25.1	25.1	--[3]	--[3]
AK	13.93	--[3]	--[3]	--[3]	25.6	25.6	--[3]	--[3]
AL	14.18	--[3]	--[3]	--[3]	26.1	26.1	--[3]	--[3]
AM	14.46	--[3]	--[3]	--[3]	26.7	26.7	--[3]	--[3]
AN	14.48	--[3]	--[3]	--[3]	26.7	26.7	--[3]	--[3]
AO	14.68	--[3]	--[3]	--[3]	27.1	27.1	--[3]	--[3]
AP	14.90	--[3]	--[3]	--[3]	27.7	27.7	--[3]	--[3]
AQ	14.94	--[3]	--[3]	--[3]	27.8	27.8	--[3]	--[3]
AR	15.14	--[3]	--[3]	--[3]	28.2	28.2	--[3]	--[3]
AS	15.39	--[3]	--[3]	--[3]	28.5	28.5	--[3]	--[3]
AT	15.73	--[3]	--[3]	--[3]	29.2	29.2	--[3]	--[3]

[1]Miles Above Mouth [2]No Levees Along Channel for These Cross Sections
[3]Refer to Green River Without Levees Floodway Data Table for Regulatory Floodway Based on Assumed Levee System Removals
[4]Represents Base Flood Elevations Within Main Channel with Flow Confined Within Levee System

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITH LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT[3] FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Green River (With Levees) (Cont'd)								
AU	16.01	--2	--2	--2	29.5	29.5	--2	--2
AV	16.33	--2	--2	--2	29.9	29.9	--2	--2
AW	16.54	--2	--2	--2	30.4	30.4	--2	--2
AX	16.76	--2	--2	--2	30.7	30.7	--2	--2
AY	16.94	--2	--2	--2	30.8	30.8	--2	--2
AZ	17.15	--2	--2	--2	31.2	31.2	--2	--2
BA	17.36	--2	--2	--2	31.5	31.5	--2	--2
BB	17.56	--2	--2	--2	31.9	31.9	--2	--2
BC	17.77	--2	--2	--2	32.3	32.3	--2	--2
BD	17.99	--2	--2	--2	32.8	32.8	--2	--2
BE	18.20	--2	--2	--2	33.2	33.2	--2	--2
BF	18.44	--2	--2	--2	33.5	33.5	--2	--2
BG	18.74	--2	--2	--2	34.0	34.0	--2	--2
BH	18.94	--2	--2	--2	34.4	34.4	--2	--2
BI	19.18	--2	--2	--2	34.8	34.8	--2	--2
BJ	19.33	--2	--2	--2	35.1	35.1	--2	--2
BK	19.51	--2	--2	--2	35.4	35.4	--2	--2
BL	19.75	--2	--2	--2	35.7	35.7	--2	--2
BM	20.01	--2	--2	--2	36.1	36.1	--2	--2
BN	20.24	--2	--2	--2	36.3	36.3	--2	--2
BO	20.47	--2	--2	--2	36.6	36.6	--2	--2
BP	20.68	--2	--2	--2	36.9	36.9	--2	--2
BQ	20.87	--2	--2	--2	37.2	37.2	--2	--2
BR	20.99	--2	--2	--2	37.3	37.3	--2	--2

[1]Miles Above Mouth
[2]Refer to Green River Without Levees Floodway Data Table for Regulatory Floodway Based on Assumed Levee System Removals
[3]Represents Base Flood Elevations Within Main Channel with Flow Confined Within Levee System

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITH LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[3]	WITHOUT[2] FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Green River (With Levees) (Cont'd)								
BS	21.23	--2	--2	--2	37.7	37.7	--2	--2
BT	21.38	--2	--2	--2	38.0	38.0	--2	--2
BU	21.62	--2	--2	--2	38.3	38.3	--2	--2
BV	21.91	--2	--2	--2	38.8	38.8	--2	--2
BW	22.11	--2	--2	--2	39.1	39.1	--2	--2
BX	22.38	--2	--2	--2	39.5	39.5	--2	--2
BY	22.59	--2	--2	--2	39.9	39.9	--2	--2
BZ	22.88	--2	--2	--2	40.3	40.3	--2	--2
CA	23.10	--2	--2	--2	40.6	40.6	--2	--2
CB	23.27	--2	--2	--2	40.9	40.9	--2	--2
CC	23.53	--2	--2	--2	41.4	41.4	--2	--2
CD	23.71	--2	--2	--2	41.7	41.7	--2	--2
CE	23.89	--2	--2	--2	42.1	42.1	--2	--2
CF	24.06	--2	--2	--2	42.3	42.3	--2	--2
CG	24.01	--2	--2	--2	42.4	42.4	--2	--2
CH	24.30	--2	--2	--2	42.8	42.8	--2	--2
CI	24.44	--2	--2	--2	43.1	43.1	--2	--2
CJ	24.63	--2	--2	--2	43.4	43.4	--2	--2
CK	24.89	--2	--2	--2	43.9	43.9	--2	--2
CL	25.12	--2	--2	--2	44.3	44.3	--2	--2
CM	25.14	--2	--2	--2	44.3	44.3	--2	--2
CN	25.00	--2	--2	--2	44.6	44.6	--2	--2
CO	25.62	--2	--2	--2	45.1	45.1	--2	--2
CP	25.90	--2	--2	--2	45.5	45.5	--2	--2

[1]Miles Above Mouth
[2]Refer to Green River Without Levees Floodway Data Table for Regulatory Floodway Based on Assumed Levee System Removals
[3]Represents Base Flood Elevations Within Main Channel with Flow Confined Within Levee System

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITH LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[3]	WITHOUT[3] FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Green River (With Levees) (Cont'd)								
CQ	26.15	--2	--2	--2	46.1	46.1	--2	--2
CR	26.64	--2	--2	--2	46.6	46.6	--2	--2
CS	26.68	--2	--2	--2	47.1	47.1	--2	--2
CT	26.93	--2	--2	--2	47.4	47.4	--2	--2
CU	27.15	--2	--2	--2	47.9	47.9	--2	--2
CV	27.36	--2	--2	--2	48.2	48.2	--2	--2
CW	27.60	--2	--2	--2	48.3	48.3	--2	--2
CX	27.88	--2	--2	--2	49.3	49.3	--2	--2
CY	28.04	--2	--2	--2	49.6	49.6	--2	--2
CZ	28.24	--2	--2	--2	49.8	49.8	--2	--2
DA	28.43	--2	--2	--2	50.6	50.6	--2	--2
DB	28.68	--2	--2	--2	52.1	52.1	--2	--2
DC	28.87	--2	--2	--2	52.6	52.6	--2	--2
DD	29.03	--2	--2	--2	53.3	53.3	--2	--2
DE	29.25	--2	--2	--2	54.0	54.0	--2	--2
DF	29.45	--2	--2	--2	54.8	54.8	--2	--2
DG	29.73	--2	--2	--2	55.9	55.9	--2	--2
DH	29.94	--2	--2	--2	56.9	56.9	--2	--2
DI	30.21	--2	--2	--2	58.5	58.5	--2	--2
DJ	30.39	--2	--2	--2	59.3	59.3	--2	--2
DK	30.59	--2	--2	--2	61.0	61.0	--2	--2
DL	30.81	--2	--2	--2	62.1	62.1	--2	--2
DM	30.98	--2	--2	--2	62.4	62.4	--2	--2
DN	31.07	--2	--2	--2	62.9	62.9	--2	--2

[1]Miles Above Mouth
[2]Refer to Green River Without Levees Floodway Data Table for Regulatory Floodway Based on Assumed Levee System Removals
[3]Represents Base Flood Elevations Within Main Channel with Flow Confined Within Levee System

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITH LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[3]	WITHOUT[3] FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Green River (With Levees) (Cont'd)								
DO	31.28	--2	--2	--2	63.6	63.6	--2	--2
DP	31.58	--2	--2	--2	64.7	64.7	--2	--2
DQ	31.90	--2	--2	--2	65.8	65.8	--2	--2
DR	32.25	--2	--2	--2	67.4	67.4	--2	--2
DS	32.58	--2	--2	--2	68.5	68.5	--2	--2
DT	32.85	--2	--2	--2	69.2	69.2	--2	--2
DU	33.10	--2	--2	--2	69.8	69.8	--2	--2
DV	33.33	--2	--2	--2	70.7	70.7	--2	--2
DW	33.55	--2	--2	--2	72.7	72.7	--2	--2
DX	33.72	--2	--2	--2	73.8	73.8	--2	--2
DY	33.78	--2	--2	--2	74.1	74.1	--2	--2
DZ	33.82	--2	--2	--2	74.8	74.8	--2	--2

[1]Miles Above Mouth
[2]Refer to Green River Without Levees Floodway Data Table for Regulatory Floodway Based on Assumed Levee System Removals
[3]Represents Base Flood Elevations Within Main Channel with Flow Confined Within Levee System

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

GREEN RIVER (WITH LEVEES)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Springbrook Creek								
A	0.00	74	342	3.2	15.0	6.5	7.5	1.0
B	0.07	26	173	6.4	15.0	7.0	7.6	0.6
C	0.16	76	436	2.5	15.0	7.8	8.7	0.9
D	0.17	67	380	2.9	15.0	7.8	8.8	1.0
E	0.32	37	168	6.6	15.0	8.7	9.1	0.4
F	0.41	48	274	4.0	15.0	10.0	11.0	1.0
G	0.49	11	100	11.0	15.0	11.4	12.4	1.0
H	0.55	25	331	3.3	16.4	15.5	15.9	0.4
I	0.57	39	440	2.5	16.4	15.5	16.1	0.6
J	0.59	59	576	1.9	16.4	15.6	16.2	0.6
K	0.63	28	346	3.2	16.4	15.6	16.2	0.6
L	0.67	24	270	4.1	16.4	15.6	16.2	0.6
M	1.25	50	439	2.9	15.8	15.8	16.3	0.5
N	1.49	83	638	2.0	16.0	16.0	16.6	0.6
O	1.62	25	297	4.0	16.0	16.0	16.7	0.7
P	1.99	63	581	2.1	16.6	16.6	17.4	0.8
Q	2.57	44	325	3.8	17.0	17.0	17.9	0.9
R	2.61	43	383	3.2	17.3	17.3	18.2	0.9
S	2.67	56	476	2.6	17.4	17.4	18.3	0.9
T	2.76	88	881	1.4	17.6	17.6	18.5	0.9
U	3.03	80	477	2.6	17.8	17.8	18.8	1.0
V	3.17	70	561	1.2	18.0	18.0	19.0	1.0
W	3.49	75	520	1.3	18.2	18.2	19.2	1.0
X	3.80	88	453	1.5	18.6	18.6	19.6	1.0
Y	3.95	59	328	2.0	19.2	19.2	20.2	1.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

SPRINGBROOK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Springbrook Creek								
Z	4.08	100	733	0.9	23.0	23.0	24.0	1.0
AA	4.29	50	316	2.1	23.2	23.2	24.1	0.9
AB	4.33	92	739	0.9	23.3	23.3	23.5	0.2
AC	4.51	30	303	1.7	23.4	23.4	23.6	0.2
AD	4.63	33	238	2.1	23.5	23.5	23.8	0.3
AE	4.82	29	218	2.3	23.7	23.7	24.0	0.3
AF	4.97	21	141	3.5	24.0	24.0	24.5	0.5
AG	5.13	28	211	2.4	24.6	24.6	25.2	0.6
AH	5.16	20	161	3.1	24.6	24.6	25.3	0.7
AI	5.36	30	202	2.5	25.4	25.4	26.1	0.7
AJ	5.53	19	147	3.4	26.2	26.2	26.8	0.6
AK	5.57	24	174	0.7	26.5	26.5	27.1	0.6
AL	5.65	30	187	0.6	26.5	26.5	27.1	0.6
AM	5.80	28	122	0.9	26.5	26.5	27.2	0.7
AN	5.94	28	87	1.3	26.7	26.7	27.3	0.6
AO	6.07	19	59	2.0	27.3	27.3	27.7	0.4
AP	6.18	25	75	1.4	27.9	27.9	28.3	0.4
AQ	6.21	34	96	1.1	28.3	28.3	28.7	0.4
AR	6.36	28	60	1.8	28.6	28.6	29.0	0.4
AS	6.38	30	69	1.4	29.0	29.7	29.7	0.7
AT	6.46	35	81	1.2	29.2	29.2	29.8	0.6
AU	6.58	23	92	0.8	30.0	30.0	30.8	0.8
AV	6.74	13	50	2.0	30.5	30.5	31.2	0.7
AW	6.85	25	99	1.0	30.8	30.8	31.4	0.6
AX	6.89	30	130	1.5	31.6	31.6	31.6	0.0
AY	7.18	30	78	3.8	33.2	33.2	33.2	0.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

SPRINGBROOK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Mill Creek - Kent								
A	0.109	63	474	1.4	18.1	18.1	19.1	1.0
B	0.138	60	322	2.0	18.1	18.1	19.1	1.0
C	0.737	49	331	2.0	19.5	19.5	20.2	0.7
D	0.788	50	323	2.0	20.3	20.3	21.0	0.7
E	1.083	56	405	1.6	22.3	22.3	22.8	0.5
F	1.410	57	328	2.0	22.7	22.7	23.2	0.5
G	1.476	41	300	2.2	22.8	22.8	23.3	0.5
H	1.660	40	276	2.4	23.9	23.9	24.3	0.4
I	1.767	50	349	1.9	24.9	24.9	25.3	0.4
J	1.803	38	325	1.6	25.2	25.2	25.5	0.3
K	1.992	37	277	1.9	25.3	25.3	25.8	0.5
L	2.203	43	346	0.8	25.6	25.6	26.0	0.4
M	2.294	42	311	0.9	25.5	25.5	26.0	0.5
N	2.357	32	254	1.1	25.7	25.7	26.2	0.5
O	2.545	41	210	1.3	25.8	25.8	26.3	0.5
P	2.612	38	270	1.0	25.9	25.9	26.4	0.5
Q	2.679	22	137	2.0	26.0	26.0	26.5	0.5
R	2.922	50	232	1.2	26.4	26.4	26.8	0.4
S	2.953	34	185	1.5	26.4	26.4	26.9	0.5
T	3.048	45	248	1.1	26.7	26.7	27.2	0.5
U	3.188	37	238	1.2	28.0	28.0	28.5	0.5
V	3.230	29	222	1.2	28.3	28.3	28.8	0.5
W	3.683	29	107	1.2	28.5	28.5	29.1	0.6
X	3.910	56	116	1.1	28.8	28.8	29.4	0.6
Y	3.943	47	78	1.7	30.0	30.0	31.0	1.0
Z	4.066	30	97	1.3	30.4	30.4	31.3	0.9
AA	4.175	27	99	1.3	30.6	30.6	31.5	0.9

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK - KENT

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Mill Creek - Kent (Cont'd)								
AB	22,218	16	82	1.6	31.4	31.4	32.3	0.9
AC	22,258	12	47	2.8	31.4	31.4	32.3	0.9
AD	22,558	12	82	1.6	31.8	31.8	32.7	0.9
AE	22,668	19	95	1.4	31.9	31.9	32.8	0.9
AF	22,828	27	85	1.5	31.9	31.9	32.8	0.9
AG	23,147	9	53	2.3	33.7	33.7	34.6	0.9
AH	23,377	24	105	1.1	33.8	33.8	34.7	0.9
AI	23,547	25	77	1.5	33.8	33.8	34.7	0.9
AJ	23,620	8	49	2.4	34.5	34.5	35.4	0.9
AK	23,640	21	100	1.2	34.7	34.7	35.5	0.8
AL	23,740	18	99	1.2	34.7	34.7	35.5	0.8
AM	24,055	22	117	1.0	35.7	35.7	36.5	0.8
AN	24,230	12	80	1.5	36.1	36.1	36.8	0.7
AO	24,275	31	163	0.7	36.1	36.1	36.8	0.7
AP	24,675	27	129	0.9	36.1	36.1	36.8	0.7
AQ	24,995	22	120	1.0	36.2	36.2	36.9	0.7
AR	25,555	26	126	0.8	36.2	36.2	36.9	0.7
AS	25,995	24	106	1.5	36.2	36.2	36.9	0.7
AT	26,395	23	137	1.0	36.3	36.3	37.1	0.8
AU	26,497	25	120	1.2	36.7	36.7	37.4	0.7
AV	26,897	19	82	1.7	36.8	36.8	37.5	0.7
AW	27,257	39	65	2.1	37.0	37.0	37.8	0.8
AX	27,537	12	51	2.7	37.3	37.3	37.9	0.6
AY	28,312	11	40	3.5	40.7	40.7	41.3	0.6
AZ	28,382	11	44	3.2	41.1	41.1	41.7	0.6

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK - KENT

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT[3] FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Mill Creek-Auburn								
A	240	--[2]	--[2]	--[2]	41.9	30.0	--[2]	--[2]
B	960	--[2]	--[2]	--[2]	41.9	30.3	--[2]	--[2]
C	1,490	--[2]	--[2]	--[2]	41.9	32.9	--[2]	--[2]
D	1,518	--[2]	--[2]	--[2]	41.9	33.0	--[2]	--[2]
E	1,720	--[2]	--[2]	--[2]	41.9	34.2	--[2]	--[2]
F	2,140	--[2]	--[2]	--[2]	41.9	34.9	--[2]	--[2]
G	2,305	--[2]	--[2]	--[2]	41.9	35.0	--[2]	--[2]
H	2,460	--[2]	--[2]	--[2]	41.9	35.4	--[2]	--[2]
I	3,140	--[2]	--[2]	--[2]	41.9	35.9	--[2]	--[2]
J	4,060	--[2]	--[2]	--[2]	41.9	36.6	--[2]	--[2]
K	4,770	--[2]	--[2]	--[2]	41.9	37.8	--[2]	--[2]
L	5,450	--[2]	--[2]	--[2]	41.9	38.3	--[2]	--[2]
M	5,630	--[2]	--[2]	--[2]	41.9	38.4	--[2]	--[2]
N	5,810	--[2]	--[2]	--[2]	41.9	39.0	--[2]	--[2]
O	6,600	--[2]	--[2]	--[2]	41.9	39.3	--[2]	--[2]
P	7,460	--[2]	--[2]	--[2]	41.9	39.3	--[2]	--[2]
Q	7,860	--[2]	--[2]	--[2]	41.9	40.0	--[2]	--[2]
R	7,990	--[2]	--[2]	--[2]	41.9	40.1	--[2]	--[2]
S	8,500	--[2]	--[2]	--[2]	41.9	40.3	--[2]	--[2]
T	8,750	--[2]	--[2]	--[2]	41.9	40.4	--[2]	--[2]
U	8,960	--[2]	--[2]	--[2]	41.9	40.8	--[2]	--[2]
V	9,420	--[2]	--[2]	--[2]	41.9	41.1	--[2]	--[2]
W	9,840	--[2]	--[2]	--[2]	41.9	41.1	--[2]	--[2]
X	10,340	--[2]	--[2]	--[2]	41.9	41.1	--[2]	--[2]
Y	10,580	--[2]	--[2]	--[2]	41.9	41.1	--[2]	--[2]

[1]Feet Above Mouth [2]Storage Floodway [3]Elevation Computed Without Consideration of Backwater From Green River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK-AUBURN

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT[3] FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Mill Creek-Auburn (Cont'd)								
Z	10,760	--[2]	--[2]	--[2]	41.9	41.3	--[2]	--[2]
AA	10,090	--2	--2	--2	41.9	41.3	--2	--2
AB	11,070	--2	--2	--2	41.9	41.7	--[2]	--[2]
AC	11,580	--2	--2	--2	41.9	41.8	--2	--2
AD	12,210	52	267	1.8	42.3	42.3	42.6	0.3
AE	12,860	70	341	1.4	42.4	42.4	42.7	0.3
AF	13,590	35	165	2.9	42.6	42.6	43.0	0.4
AG	14,420	44	125	3.8	43.1	43.1	43.8	0.7
AH	14,766	17	71	5.6	44.1	44.1	44.6	0.5
AI	15,160	32	190	2.1	46.0	46.0	46.6	0.6
AJ	15,850	51	219	1.8	46.2	46.2	46.9	0.7
AK	17,050	44	168	2.4	46.7	46.7	47.3	0.6
AL	17,940	34	142	2.8	47.3	47.3	47.9	0.6
AM	18,190	15	83	4.3	47.5	47.5	48.1	0.6
AN	18,360	103	241	1.5	47.9	47.9	48.4	0.5
AO	19,220	98	195	1.8	48.5	48.5	49.1	0.6
AP	20,120	110	139	2.6	49.3	49.3	49.8	0.5
AQ	21,210	13	181	4.9	50.3	50.3	50.8	0.5
AR	21,630	260	67	0.6	50.4	50.4	50.9	0.5
AS	22,070	310	573	1.1	51.4	51.4	52.4	1.0
AT	22,680	310	312	0.7	52.2	52.2	52.6	0.4
AU	23,370	8	497	1.0	52.8	52.8	53.2	0.4
AV	23,760	220	325	6.9	53.0	53.0	53.5	0.5
AW	24,590	230	48	0.3	53.3	53.3	53.6	0.3
AX	25,450	250	1,127	0.4	56.4	56.4	57.4	1.0

[1]Feet Above Mouth [2]Storage Floodway [3]Elevation Computed Without Consideration of Backwater From Green River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK-AUBURN

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Mill Creek-Auburn (Cont'd)								
AY	24,590	230	933	0.4	56.5	56.5	57.5	1.0
AZ	25,450	250	395	0.9	56.6	56.6	57.6	1.0
BA	25,680	215	251	1.5	56.9	56.9	57.6	0.8
BB	26,430	219	194	1.6	58.0	58.0	58.3	0.3
BC	27,250	135	221	1.4	58.7	58.7	59.1	0.4
BD	28,200	22	77	4.1	60.0	60.0	60.7	0.7
BE	29,000	40	114	2.8	61.7	61.7	62.1	0.4
BF	29,240	42	222	1.4	61.8	61.8	62.3	0.5
BG	29,512	38	223	1.4	61.8	61.8	62.3	0.5
BH	29,650	26	94	3.3	61.7	61.7	62.2	0.5
BI	30,480	56	95	3.3	62.3	62.3	62.7	0.4
BJ	31,310	33	109	2.9	62.7	62.7	63.0	0.3
BK	31,620	18	37	8.3	62.9	62.9	62.9	0.0
BL	31,747	6	30	10.4	63.7	63.7	63.7	0.0
BM	32,430	39	293	1.1	67.4	67.4	68.1	0.7

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK-AUBURN

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	[illegible]	[illegible] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	[illegible]	[illegible]	[illegible]	INCREASE
Big Soos Creek								
A	17,687	20	76	10.5	171.3	171.3	171.4	0.1
B	17,849	20	201	4.0	174.4	174.4	174.4	0.0
C	17,949	63	276	2.9	174.6	174.6	174.6	0.0
D	18,909	72	194	4.1	182.8	182.8	182.8	0.0
E	20,189	33	180	4.4	199.2	199.2	200.0	0.8
F	20,989	52	170	4.7	210.1	210.1	211.1	1.0
G	21,939	51	295	2.7	216.7	216.7	217.7	1.0
H	23,099	32	85	9.4	232.7	232.7	232.7	0.0
I	25,019	46	244	3.3	258.6	258.6	259.6	1.0
J	25,969	27	113	7.1	268.5	268.5	269.2	0.7
K	26,609	32	124	3.1	281.5	281.5	281.5	0.0
L	27,769	37	77	5.0	296.3	296.3	296.4	0.1
M	29,169	41	220	1.8	303.4	303.4	304.4	1.0
N	29,369	33	168	2.3	303.9	303.9	304.9	1.0
O	29,515	48	246	1.6	304.4	304.4	305.2	0.8
P	30,315	49	196	2.0	305.7	305.7	306.6	0.9
Q	31,515	43	143	2.7	309.6	309.6	310.6	1.0
R	32,635	165	620	0.6	310.8	310.8	311.8	1.0
S	33,124	32	151	2.6	313.1	313.1	313.8	0.7
T	33,224	185	722	0.5	313.1	313.1	314.0	0.9
U	33,904	44	95	3.0	313.3	313.3	314.3	1.0
V	34,704	48	176	1.6	316.1	316.1	316.5	0.4
W	34,954	66	289	1.0	316.3	316.3	316.7	0.4
X	35,113	40	176	1.6	316.4	316.4	316.8	0.4
Y	36,313	59	286	1.0	316.6	316.6	317.6	1.0
Z	38,163	190	365	0.8	317.5	317.5	318.4	0.9

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

BIG SOOS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Big Soos Creek (Cont'd)								
AA	39,843	217	264	1.1	319.9	319.9	320.1	0.2
AB	41,903	96	248	1.1	323.7	323.7	324.7	1.0
AC	42,248	34	210	1.3	326.6	326.6	326.8	0.2
AD	42,448	63	240	1.2	326.7	326.7	327.2	0.5
AE	43,209	25	120	2.3	326.9	326.9	327.7	0.8
AF	43,329	134	510	0.5	327.1	327.1	327.8	0.7
AG	44,689	34	126	2.2	327.3	327.3	328.3	1.0
AH	46,529	21	96	2.9	331.0	331.0	332.0	1.0
AI	46,677	19	99	2.8	331.2	331.2	332.2	1.0
AJ	46,837	27	129	1.7	331.7	331.7	332.6	0.9
AK	47,737	24	100	2.2	332.6	332.6	333.5	0.9
AL	48,280	23	72	3.1	333.9	333.9	334.3	0.4
AM	48,290	45	73	3.0	334.0	334.4	334.4	0.4
AN	50,070	59	118	1.9	335.5	335.5	336.5	1.0
AO	52,270	21	58	3.8	340.6	340.6	340.6	0.0
AP	52,470	50	160	1.4	342.2	342.2	342.2	1.0
AQ	53,670	56	201	1.1	343.0	343.0	344.0	1.0
AR	55,010	143	335	0.7	344.1	344.1	345.0	0.9
AS	55,156	13	62	3.6	344.6	344.6	345.6	1.0
AT	55,216	94	290	0.8	345.2	345.2	346.0	0.8
AU	56,896	20	47	4.7	346.9	346.9	347.5	0.6
AV	57,636	101	232	0.9	348.1	348.1	349.0	0.9
AW	57,886	14	50	4.4	348.3	348.3	349.2	0.9
AX	58,015	68	159	1.4	349.3	349.3	350.0	0.7

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

BIG SOOS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Big Soos Creek (Cont'd)								
AY	59,215	13	42	5.2	351.0	351.0	351.8	0.8
AZ	60,495	76	127	1.7	354.9	354.9	355.7	0.8
BA	60,775	15	46	4.7	355.7	355.7	356.5	0.8
BB	61,025	49	101	1.5	357.0	357.0	357.2	0.2
BC	61,925	27	31	4.8	358.7	358.7	358.7	0.0
BD	62,323	13	46	3.3	360.6	360.6	361.4	0.8
BE	62,473	139	361	0.4	361.0	361.0	361.7	0.7
BF	64,353	44	115	1.3	361.1	361.1	362.1	1.0
BG	65,563	31	42	2.2	364.3	364.3	364.3	0.0
BH	66,623	40	75	1.2	365.8	365.8	366.6	0.8
BI	67,623	46	64	1.4	368.0	368.0	369.0	1.0
BJ	67,792	5	19	4.9	370.0	370.0	370.3	0.3
BK	67,932	11	44	2.0	370.6	370.6	370.9	0.3
BL	68,932	84	201	0.4	370.8	370.8	371.5	0.7
BM	70,132	11	24	3.7	371.4	371.4	372.2	0.8
BN	71,516	74	134	0.7	380.3	380.3	380.3	0.0
BO	72,676	90	234	0.4	380.3	380.3	380.8	0.5
BP	74,054	97	77	1.2	380.7	380.7	381.6	0.9
BQ	75,314	17	16	5.6	396.8	396.8	396.8	0.0

[1]Feet Above Mouth

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
White River								
A - D[2]								
E	6.47	448	2,831	6.5	90.1	90.1	90.1	0.0
F	6.69	380	1,498	12.3	92.8	92.8	92.8	0.0
G	6.84	329	1,444	12.7	99.0	99.0	99.0	0.0
H	7.04	295	1,327	13.9	106.1	106.1	106.1	0.0
I	7.27	189	1,258	14.6	112.7	112.7	112.7	0.0
J	7.43	215	1,400	13.1	118.3	118.3	118.3	0.0
K	7.51	223	1,276	14.4	120.5	120.5	120.5	0.0
L	7.63	242	1,768	10.4	125.1	125.1	125.1	0.0
M	7.79	314	1,937	9.5	128.6	128.6	128.6	0.0
N	8.01	334	1,938	9.5	134.5	134.5	134.5	0.0
O	8.19	240	1,274	14.4	141.2	141.2	141.6	0.4
P	8.59	300	2,298	8.0	155.6	155.6	156.0	0.4

[1]Miles Above Mouth

[2]Floodway Not Applicable

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

WHITE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Sammamish River								
A	0.25	80	803	4.8	15.0	15.0	15.0	0.0
B	1.10	45	1,007	3.5	17.5	17.5	17.5	0.0
C	1.30	45	954	3.7	18.2	18.2	18.2	0.0
D	1.78	40	1,081	3.2	19.1	19.1	19.2	0.1
E	2.44	65	1,214	2.9	20.2	20.2	20.2	0.0
F	2.79	75	1,253	2.6	20.7	20.7	20.7	0.0
G	3.52	55	1,303	2.7	21.5	21.5	21.5	0.0
H	3.92	65	1,196	2.9	22.0	22.0	22.0	0.0
I	4.90	85	1,179	2.7	23.1	23.1	23.1	0.0
J	5.50	50	1,093	2.9	23.8	23.8	23.8	0.0
K	6.05	50	1,068	2.8	24.4	24.4	24.4	0.0
L	6.30	40	1,111	2.7	24.8	24.8	24.8	0.0
M	7.00	40	1,041	2.9	25.6	25.6	25.6	0.0
N	7.35	55	1,144	2.6	26.0	26.0	26.0	0.0
O	7.70	45	1,159	2.6	26.4	26.4	26.4	0.0
P	8.30	40	1,141	2.6	27.0	27.0	27.0	0.0
Q	9.20	45	1,123	2.6	27.8	27.8	27.8	0.0
R	9.30	45	1,094	2.7	28.1	28.1	28.3	0.2
S	10.68	45	1,184	2.5	28.3	28.3	28.7	0.4
T	10.99	70	1,096	2.7	28.6	28.6	29.0	0.4
U	11.80	75	1,111	2.6	29.6	29.6	29.8	0.2
V	12.79	60	1,102	2.6	30.6	30.6	30.8	0.2
W	13.05	60	1,060	2.7	30.9	30.9	31.1	0.2
X	13.28	80	1,133	2.5	31.1	31.1	31.3	0.2
Y	13.70	60	1,196	1.9	31.6	31.6	31.8	0.2

[1]Miles Above Mouth

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Sammamish River (Cont'd)								
Z	14.15	50	1,180	1.9	31.8	31.8	32.0	0.2
AA	14.35	180	2,472	0.9	32.0	32.0	32.1	0.1
AB	14.65	150	1,891	1.2	32.0	32.0	32.2	0.2
AC	14.95	120	1,977	1.3	32.2	32.2	32.4	0.2

[1]Miles Above Mouth

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT[3] FLOODWAY	WITH[3] FLOODWAY	INCREASE
					(FEET NGVD)			
Swamp Creek								
A	960	50	232	3.9	17.5	16.2	16.2	0.0
B	1,400	47	240	3.8	17.5	17.0	17.0	0.0
C	1,870	147	652	1.4	21.4	21.4	22.4	1.0
D	2,300	45	294	3.1	21.6	21.6	22.6	1.0
E	2,491	84	374	2.4	22.4	22.4	23.2	0.8
F	2,791	26	191	4.8	22.7	22.7	23.3	0.6
G	3,271	28	214	4.3	23.5	23.5	24.4	0.9
H	3,860	54	283	3.2	24.7	24.7	25.6	0.9
I	4,461	413	1,330	0.7	25.3	25.3	26.3	1.0
J	5,151	302	419	2.1	26.9	26.1	27.1	1.0
K	5,661	530	834	1.0	30.4	28.3	29.3	1.0
L	6,271	286	275	3.2	32.0	31.0	31.9	0.9
M	6,961	467	865	1.0	36.1	34.4	35.4	1.0
N	7,561	37	95	9.1	40.3	39.5	39.5	0.0
O	7,941	59	223	3.9	42.4	42.7	43.6	0.9
P	8,141	47	192	4.5	44.3	44.3	44.9	0.6
Q	8,181	66	186	4.7	44.7	44.7	45.0	0.3
R	8,931	242	397	2.2	49.7	49.7	50.1	0.4
S	9,631	33	93	9.4	52.9	52.9	53.0	0.1
T	9,961	295	351	2.5	57.0	57.0	57.9	0.9
U	10,231	75	143	6.1	59.1	59.1	59.6	0.5
V	10,791	48	172	5.1	64.3	64.3	65.3	1.0
W	11,381	55	144	6.0	71.4	71.4	71.4	0.0
X	12,031	28	176	4.9	75.3	75.3	76.2	0.9
Y	12,791	57	169	5.1	80.4	80.4	80.7	0.3

[1]Feet Above Mouth [2]Elevations Computed for Flow Confined to Main Channel Between Sections I and N

[3]Elevations Computed Without Consideration of Backwater from Sammamish River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

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SWAMP CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
North Creek								
A	200	54	209	3.0	19.8	19.8	19.8	0.0
B	450	45	219	2.9	20.0	20.0	20.0	0.0
C	1,000	37	139	4.6	20.5	20.5	20.5	0.0
D	1,650	52	190	3.3	21.5	21.5	21.5	0.0
E	2,300	42	109	5.8	22.4	22.4	22.4	0.0
F	2,940	39	148	4.3	24.0	24.0	24.0	0.0
G	3,770	63	177	3.6	25.8	25.8	25.8	0.0
H	4,070	49	143	4.4	26.8	26.8	26.8	0.0
I	4,320	70	159	4.0	27.3	27.3	27.3	0.0
J-N[2]								

[1]Feet Above Mouth [2]Cross Sections Located Within City of Bothell (Not a Part of this Study)

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

NORTH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT[2] FLOODWAY	WITH[2] FLOODWAY	INCREASE
					(FEET NGVD)			
Little Bear Creek								
A	40	39	289	1.7	24.1	23.8	23.8	0.0
B	177	8	78	6.4	25.6	25.6	25.6	0.0
C	427	14	97	5.2	26.4	26.4	26.7	0.3
D	577	24	70	7.1	26.3	26.3	27.0	0.7
E	617	19	52	9.6	27.3	27.3	27.3	0.0
F	764	39	182	2.7	33.3	33.3	33.4	0.1
G	849	31	102	4.9	33.3	33.3	33.4	0.1
H	949	49	124	4.4	33.8	33.8	33.9	0.1
I	1,059	55	247	2.3	36.3	36.3	36.3	0.0
J	1,159	44	179	3.2	36.5	36.5	36.5	0.0
K	1,199	50	194	2.9	36.5	36.5	36.5	0.0
L	1,224	31	137	4.1	36.5	36.5	36.5	0.0
M	1,413	26	157	3.6	38.2	38.2	38.2	0.0
N	1,493	31	183	3.1	38.3	38.3	38.4	0.1
O	1,773	32	109	5.2	38.5	38.5	38.6	0.1
P	1,979	11	51	11.0	42.8	42.8	43.2	0.4
Q	2,103	24	174	3.3	45.7	45.7	45.7	0.0
R	2,792	20	104	5.4	48.3	48.3	49.1	0.8
S	3,642	34	130	4.4	53.7	53.7	54.1	0.4
T	4,602	38	89	6.4	60.9	60.9	61.3	0.4
U	5,122	28	129	4.4	64.4	64.4	65.4	1.0
V	5,962	24	94	6.0	69.3	69.3	69.9	0.6
W	6,652	45	303	1.8	80.9	80.9	80.9	0.0
X	7,052	24	111	4.8	81.1	81.1	81.6	0.5

[1]Feet Above Mouth [2]Elevations Computed With Consideration of 25-Year Sammamish River Backwater Elevation

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE BEAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT[2] FLOODWAY	WITH[2] FLOODWAY	INCREASE
						(FEET NGVD)		
Little Bear Creek (Cont'd)								
Y	7,452	36	175	3.1	83.6	83.6	84.6	1.0
Z	7,762	23	148	3.6	90.7	90.7	90.7	0.0
AA	8,162	27	150	3.6	91.2	91.2	92.2	1.0
AB	9,522	21	73	7.4	100.9	100.9	101.7	0.8
AC	10,562	23	136	4.0	110.4	110.4	111.0	0.6
AD	10,742	46	247	2.2	110.9	110.9	111.5	0.6

[1]Feet Above Mouth [2]Elevations Computed With Consideration of 25-Year Sammamish River Backwater Elevation

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE BEAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Bear Creek								
A	0.23	310	306	5.0	31.7	31.7	31.7	0.0
B	0.30	500	686	2.6	34.7	34.7	35.2	0.5
C	0.65	650	669	2.4	36.2	36.2	36.5	0.3
D	0.79	1,060	1,149	1.4	36.9	36.9	36.9	0.0
E	0.92	60	300	1.6	37.8	37.8	37.8	0.0
F	1.00	200	307	5.0	42.4	42.4	42.4	0.0
G	1.04	310	3,629	0.6	43.0	43.0	43.0	0.0
H	1.13	500	2,585	0.8	43.0	43.0	43.1	0.1
I	1.33	150	231	4.8	44.6	44.6	44.7	0.1
J	1.73	200	636	2.3	49.2	49.2	49.5	0.3
K	2.05	410	1,340	1.4	50.1	50.1	50.8	0.7
L	2.39	210	626	1.8	51.4	51.4	52.1	0.7
M	2.81	200	400	3.1	56.3	56.3	57.2	0.9
N	3.04	180	701	2.1	58.9	58.9	59.9	1.0
O	3.68	290	332	2.9	66.9	66.9	67.4	0.5
P	3.88	210	415	2.5	70.1	70.1	70.8	0.7
Q	4.16	180	477	2.0	71.1	71.7	72.5	0.8
R	4.51	120	299	3.5	77.0	77.0	77.6	0.6
S	4.61	110	510	2.1	72.9	79.2	79.9	0.7
T	4.98	150	221	4.9	85.1	85.1	85.5	0.4
U	5.20	210	931	1.4	89.8	89.8	90.1	0.3
V	5.30	40	224	2.3	90.5	90.5	90.9	0.4
W	5.31	40	237	2.2	90.7	90.7	91.1	0.4
X	5.39	85	245	2.1	91.6	91.6	92.0	0.4
Y	5.54	34	179	2.9	94.2	94.2	95.0	0.8

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

BEAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Bear Creek (Cont'd)								
Z	5.67	41	176	3.0	97.2	97.2	97.9	0.7
AA	5.81	38	189	2.8	100.3	100.3	100.8	0.5
AB	5.94	48	144	3.5	102.8	102.8	103.1	0.3
AC	5.98	44	128	3.9	104.0	104.0	104.1	0.1
AD	6.02	81	270	1.9	105.1	105.1	105.2	0.1
AE	6.21	96	230	2.2	110.2	110.2	110.8	0.6
AF	6.41	69	255	2.0	118.4	118.4	118.9	0.5
AG	6.45	20	122	4.1	119.0	119.0	119.5	0.5
AH	6.45	20	102	4.9	119.0	119.0	119.6	0.6
AI	6.49	79	313	1.6	120.2	120.2	120.6	0.4
AJ	6.63	84	235	1.8	122.0	122.0	122.6	0.6
AK	6.75	76	189	2.3	124.7	124.7	125.2	0.5
AL	6.90	30	129	3.3	127.3	127.3	128.1	0.8
AM	6.97	71	197	2.2	128.7	128.7	129.7	1.0
AN	7.03	83	283	1.5	129.6	129.6	130.6	1.0
AO	7.20	81	244	1.8	133.2	133.2	134.2	1.0
AP	7.23	31	122	3.5	133.8	133.8	134.7	0.9
AQ	7.23	31	139	3.1	134.1	134.1	135.0	0.9
AR	7.29	49	143	3.0	135.8	135.8	136.4	0.6
AS	7.37	29	107	4.0	138.4	138.4	138.7	0.3
AT	7.42	47	212	2.0	139.4	139.4	139.9	0.5
AU	7.60	23	56	7.3	142.8	142.8	143.1	0.3
AV	7.67	34	105	3.9	146.9	146.9	147.7	0.8
AW	7.76	42	140	2.9	150.2	150.2	150.5	0.3
AX	7.84	33	121	3.4	152.3	152.3	152.3	0.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

BEAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Bear Creek (Cont'd)								
AY	7.88	9	36	11.4	154.9	154.9	154.9	0.0
AZ	7.94	27	140	2.4	158.8	158.8	159.3	0.5
BA	8.10	39	92	3.6	161.5	161.5	162.4	0.9
BB	8.16	19	76	4.4	164.8	164.8	164.9	0.1
BC	8.16	19	85	3.9	165.2	165.2	165.3	0.1
BD	8.21	46	149	2.2	166.3	166.3	166.5	0.2
BE	8.34	29	74	4.5	170.8	170.8	171.3	0.5
BF	8.54	44	130	2.5	180.3	180.3	180.4	0.1
BG	8.70	84	262	1.3	183.0	183.0	183.5	0.5
BH	8.87	86	177	1.7	185.6	185.6	186.6	1.0
BI	8.97	56	69	4.5	194.4	194.4	194.6	0.2
BJ	9.04	23	94	3.3	201.0	201.0	201.0	0.0
BK	9.08	43	76	4.1	202.8	202.8	202.9	0.1
BL	9.18	23	73	4.2	211.8	211.8	211.8	0.0
BM	9.31	87	166	1.9	218.6	218.6	218.7	0.1
BN	9.40	95	168	1.8	222.0	222.0	222.0	0.0
BO	9.55	114	142	2.2	229.3	229.3	229.3	0.0
BP	9.61	34	99	3.1	232.0	232.0	232.0	0.0
BQ	9.65	38	124	2.5	233.1	233.1	233.2	0.1
BR	9.76	36	101	2.9	236.3	236.3	236.8	0.5
BS	9.85	44	130	2.2	239.5	239.5	239.7	0.2
BT	9.98	64	234	1.2	240.5	240.5	241.0	0.5
BU	10.09	54	199	1.5	241.2	241.2	242.0	0.8
BV	10.13	20	83	2.8	241.7	241.7	242.5	0.8
BW	10.14	20	79	2.9	242.0	242.0	242.7	0.7

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

BEAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Bear Creek (Cont'd)								
BX	10.17	34	111	2.1	242.8	242.8	243.4	0.6
BY	10.23	31	118	1.9	245.0	245.0	245.5	0.5
BZ	10.32	30	103	2.2	246.4	246.4	247.1	0.7
CA	10.49	51	127	1.8	251.5	251.5	251.9	0.4
CB	10.64	47	132	1.7	255.2	255.2	255.5	0.3
CC	10.69	44	162	1.4	255.8	255.8	256.3	0.5
CD	11.02	45	188	1.2	258.2	258.2	259.1	0.9

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

BEAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Evans Creek								
A	0.18	200	683	0.7	50.4	50.4	21.2	0.8
B	0.81	190	136	2.1	56.3	56.3	56.8	0.5
C	1.21	90	197	1.7	62.5	62.5	63.3	0.8
D	1.41	294	552	1.1	63.2	63.2	64.0	0.8
E	1.71	189	290	1.2	63.8	63.8	64.7	0.9
F	1.95	300	400	1.1	65.3	65.3	66.3	1.0
G	2.28	125	116	2.6	67.9	67.9	68.4	0.5
H	2.29	128	159	1.4	68.6	68.6	68.9	0.3
I	2.48	144	100	2.4	72.3	72.3	72.5	0.2
J	2.67	120	170	1.4	75.1	75.1	75.4	0.3
K	2.88	150	157	2.1	76.4	76.4	76.8	0.4
L	3.01	208	652	0.6	76.8	76.8	77.4	0.6
M	3.14	170	65	4.7	79.1	79.1	79.1	0.0
N	3.53	159	472	1.0	84.3	84.3	84.3	0.0
O	3.85	200	396	1.2	85.1	85.1	85.4	0.3
P	4.21	220	137	2.2	92.6	92.6	92.6	0.0
Q	4.27	207	90	1.8	95.1	95.1	95.1	0.0
R	4.65	120	56	3.6	101.7	101.7	102.0	0.3

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

EVANS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Issaquah Creek								
A	950.4	1,950	2,974	2.2	34.5	34.5	34.5	0.0
B	1,953.6	1,650	1,422	3.3	36.3	36.3	36.3	0.0
C	3,590.4	1,000	936	3.4	42.9	42.9	42.9	0.0
D	5,702.4	290	1,895	2.3	47.8	47.8	47.9	0.1
E	6,230.4	121	658	7.2	49.1	49.1	49.2	0.1
F	7,075.2	253	1,251	3.4	51.5	51.5	51.8	0.3
G	7,814.4	65	476	9.0	52.4	52.4	53.1	0.7
H	8,553.6	125	976	4.4	54.8	54.8	55.8	1.0
I	9,398.4	76	491	8.8	56.4	56.4	57.1	0.7
J	9,609.6	92	489	8.8	58.3	58.3	58.5	0.2
K	9,926.4	160	1,158	3.7	60.3	60.3	60.4	0.1
L	10,401.6	104	672	6.4	60.7	60.7	60.8	0.1
M	10,560.0	86	521	8.3	61.7	61.7	61.8	0.1
N	11,193.6	90	764	5.6	64.7	64.7	64.9	0.2
O	11,668.8	95	649	6.6	65.8	65.8	66.1	0.3
P	11,721.6	144	840	5.1	66.6	66.6	66.9	0.3
Q	12,355.2	130	985	4.4	68.1	68.1	68.3	0.2
R	12,724.8	90	572	7.5	68.6	68.6	68.9	0.3
S	13,041.6	120	651	6.6	70.4	70.4	70.8	0.4
T	13,516.8	114	514	8.4	74.4	74.4	74.5	0.1
U	13,622.4	83	787	4.4	75.9	75.9	75.9	0.0
V	14,256.0	69	548	6.4	77.0	77.0	77.1	0.1
W	14,308.8	72	506	6.9	78.8	78.8	78.9	0.1
X	14,889.6	113	783	4.0	81.0	81.0	81.1	0.1
Y	15,734.4	97	633	5.0	82.5	82.5	82.7	0.2
Z	16,262.4	73	483	6.6	84.5	84.5	84.7	0.2

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

ISSAQUAH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Issaquah Creek (Cont'd)								
AA	16,948.8	64	566	5.6	87.2	87.2	87.4	0.2
AB	17,054.4	91	589	5.4	88.1	88.1	88.3	0.2
AC	17,265.6	55	365	8.7	88.8	88.8	89.0	0.2
AD	17,371.2	60	462	6.9	91.0	91.0	91.1	0.1
AE	17,740.8	77	558	5.7	92.4	92.4	92.7	0.3
AF	18,110.4	123	788	4.0	93.6	93.6	94.0	0.4
AG	18,638.4	400	1,327	2.4	94.1	94.1	94.5	0.4
AH	18,796.8	339	1,154	2.7	94.4	94.4	94.7	0.3
AI	19,430.4	66	408	7.8	97.2	97.2	97.3	0.1
AJ	20,064.0	88	571	5.6	100.7	100.7	100.7	0.0
AK	20,803.2	100	610	5.2	102.9	102.9	102.9	0.0
AL	21,014.4	141	696	4.6	112.0	112.0	112.0	0.0
AM	21,384.0	76	388	8.2	113.0	113.0	113.0	0.0
AN	22,228.8	239	1,200	2.6	115.7	115.7	116.3	0.6
AO	23,073.6	313	832	3.8	117.3	117.3	118.2	0.9
AP	23,812.8	114	562	5.5	120.9	120.9	121.9	1.0
AQ	24,710.4	300	705	4.4	125.4	125.4	125.9	0.5
AR	24,763.2	330	853	3.6	125.5	125.5	126.0	0.5
AS	25,185.6	110	437	7.1	128.0	128.0	128.3	0.3
AT	25,977.6	98	745	4.2	130.5	130.5	131.2	0.7
AU	26,716.8	64	396	7.8	131.9	131.9	132.5	0.6
AV	27,456.0	63	437	7.1	136.0	136.0	136.4	0.4
AW	27,825.6	64	453	6.8	137.3	137.3	138.0	0.7
AX	28,089.6	63	391	7.8	141.2	141.2	141.9	0.7
AY	28,406.4	66	496	6.2	143.6	143.6	144.6	1.0
AZ	28,934.4	73	618	4.9	145.7	145.7	146.7	1.0

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

ISSAQUAH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Issaquah Creek (Cont'd)								
BA	29,462.4	98	582	5.2	146.5	146.5	147.5	1.0
BB	30,096.0	19	488	6.3	149.4	149.4	150.0	0.6
BC	31,152.0	85	463	6.6	152.8	152.8	153.0	0.2
BD	32,208.0	84	476	6.4	156.0	156.0	156.3	0.3
BE	33,422.4	163	569	5.3	160.0	160.0	160.2	0.2
BF	34,478.4	170	452	6.4	166.7	166.7	167.2	0.5
BG	35,798.4	292	826	3.5	175.6	175.6	176.6	1.0
BH	36,960.0	74	294	9.8	182.1	182.1	182.1	0.0
BI	37,224.0	74	449	6.4	188.8	188.8	188.9	0.1
BJ	38,121.6	103	389	7.4	191.2	191.2	191.2	0.0
BK	38,702.4	119	368	7.8	196.9	196.9	197.1	0.2
BL	39,230.4	52	198	14.5	200.2	200.2	200.4	0.2
BM	40,022.4	120	510	5.6	210.9	210.9	210.9	0.0
BN	41,078.4	96	344	8.4	218.6	218.6	218.6	0.0
BO	42,345.6	52	280	10.3	224.0	224.0	224.0	0.0
BP	42,451.2	68	386	6.3	225.6	225.6	225.6	0.0
BQ	43,032.0	67	243	10.0	228.2	228.2	228.4	0.2
BR	43,401.6	45	281	7.2	229.8	229.8	230.8	1.0
BS	44,193.6	43	175	11.6	233.9	233.9	233.9	0.0
BT	45,196.8	40	232	8.7	240.2	240.2	240.5	0.3
BU	45,355.2	39	182	11.1	240.8	240.8	241.1	0.3
BV	45,460.8	44	374	5.4	245.3	245.3	245.3	0.0
BW	45,566.4	41	340	5.9	245.4	245.4	245.4	0.0
BX	46,728.0	32	159	12.7	248.4	248.4	248.4	0.0
BY	47,520.0	37	188	10.7	255.6	255.6	256.1	0.5
BZ	48,945.6	52	224	9.0	265.0	265.0	265.2	0.2

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

ISSAQUAH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Issaquah Creek (Cont'd)								
CA	50,001.6	118	350	5.8	269.4	269.4	269.9	0.5
CB	50,952.0	219	387	5.2	275.4	275.4	275.4	0.0
CC	51,796.8	48	182	11.1	280.8	280.8	280.9	0.1
CD	52,800.0	132	433	4.7	287.9	287.9	288.7	0.8
CE	52,958.4	42	235	8.1	288.9	288.9	289.9	1.0
CF	53,011.2	42	216	8.9	291.3	291.3	291.3	0.0
CG	53,116.8	192	634	3.0	292.8	292.8	292.8	0.0
CH	53,222.4	38	271	7.1	293.0	293.0	293.1	0.1
CI	53,380.8	184	885	2.2	294.2	294.2	294.4	0.2
CJ	54,595.2	125	247	7.7	300.1	300.1	300.1	0.0
CK	55,334.5	165	554	3.4	305.0	305.0	306.0	1.0
CL	56,284.8	193	320	6.0	310.5	310.5	310.7	0.2
CM	56,601.6	41	251	7.6	312.5	312.5	313.5	1.0
CN	57,921.6	39	213	9.0	321.2	321.2	321.6	0.4
CO	59,664.0	51	267	6.2	331.5	331.5	332.4	0.9
CP	59,769.5	45	233	7.2	332.1	332.1	332.9	0.8
CQ	59,822.4	51	340	4.9	334.4	334.4	334.6	0.2
CR	59,875.2	54	332	5.0	334.8	334.8	334.8	0.0
CS	61,036.8	40	172	9.7	339.3	339.3	339.7	0.4
CT	62,515.2	58	242	6.9	351.8	351.8	352.7	0.9
CU	63,571.2	53	269	6.2	359.1	359.1	360.1	1.0
CV	65,102.4	35	186	9.0	375.4	375.4	375.4	0.0
CW	66,528.0	47	283	5.9	387.8	387.8	388.7	0.9

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

ISSAQUAH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
North Fork Issaquah Creek								
A	0.02	430	538	1.0	50.3	50.3	50.5	0.2
B	0.11	500	155	2.0	50.4	50.4	50.5	0.1
C	0.19	220	53	3.4	55.3	55.3	55.3	0.0
D	0.27	200	571	1.0	56.6	56.6	56.8	0.2
E	0.34	220	165	2.6	57.9	57.9	58.6	0.7
F	0.38	210	400	0.8	58.7	58.7	59.6	0.9
G	0.39	210	276	1.1	59.2	59.2	59.9	0.7
H	0.40	215	644	0.9	59.3	59.3	60.1	0.8
I	0.48	300	61	4.5	65.3	65.3	65.8	0.5
J	0.57	260	307	1.0	65.3	65.3	66.2	0.9
K	0.61	200	576	0.5	65.8	65.8	66.6	0.8
L	0.66	220	461	0.4	65.8	66.7	66.7	0.9
M	0.75	180	130	1.3	66.7	66.7	67.5	0.8
N	0.78	220	108	1.4	66.7	66.7	67.5	0.8
O	0.81	280	163	0.9	66.8	66.8	67.6	0.8
P	0.92	200	1167	0.6	73.9	73.9	73.9	0.0
Q	0.94	125	899	0.8	73.9	73.9	73.9	0.0
R	0.95	150	336	1.0	73.9	73.9	73.9	0.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

NORTH FORK ISSAQUAH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
East Fork Issaquah Creek								
A	0.02	26	120	7.1	75.2	72.9[2]	73.3	0.5
B	0.07	25	110	7.8	76.2	76.2	76.3	0.1
C	0.12	35	118	7.2	79.6	79.6	79.8	0.2
D	0.15	21	75	10.6	81.7	81.7	81.7	0.0
E	0.19	34	150	5.1	85.7	85.7	86.0	0.3
F	0.21	42	116	6.6	86.2	86.2	86.5	0.3
G	0.30	36	90	7.2	92.0	92.0	92.0	0.0
H	0.37	37	78	8.3	97.1	97.1	97.1	0.0
I	0.39	45	129	5.0	99.2	99.2	99.2	0.0
J	0.40	40	168	5.1	99.9	99.9	99.9	0.0
K	0.47	17	77	11.0	103.1	103.1	103.2	0.1
L	0.55	42	154	5.5	108.0	108.9	109.9	1.0
M	0.65	24	92	9.2	116.5	116.5	116.5	0.0
N	0.75	30	117	7.3	123.6	123.6	124.6	1.0
O	0.87	32	103	8.3	134.6	134.6	134.6	0.0

[1]Miles Above Mouth
[2]Water-Surface Elevation Computed Without Considering Backwater Effects

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK ISSAQUAH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
West Fork Issaquah Creek								
A	130	21	74	7.5	231.1	231.1	232.1	1.0
B	230	10	45	12.4	234.6	234.6	234.6	0.0
C	404	24	181	3.0	240.2	240.2	240.2	0.0
D	1,304	35	69	8.0	255.6	255.6	255.7	0.1
E	2,204	22	59	9.3	273.2	273.2	273.2	0.0
F	3,384	24	59	8.9	305.0	305.0	305.0	0.0
G	4,214	30	70	7.6	313.2	313.2	313.3	0.1
H	4,294	22	76	7.0	314.9	314.9	315.1	0.2
I	4,508	39	214	2.5	318.3	318.3	319.2	0.9
J	4,708	88	468	1.1	318.3	318.3	319.3	1.0
K	4,917	156	703	0.8	318.4	318.4	319.4	1.0
L	5,267	167	467	1.1	318.4	318.4	319.4	1.0
M	5,570	139	278	1.2	318.6	318.6	319.6	1.0
N	6,570	26	48	6.9	320.2	320.2	320.2	0.0
O	7,740	27	108	1.9	322.6	322.6	323.4	1.0
P	7,966	26	93	2.1	323.9	323.9	324.8	0.9
Q	8,346	26	104	1.9	324.6	324.6	325.2	0.6
R	8,774	28	115	1.7	325.0	325.0	325.7	0.7
S	9,324	64	165	1.2	325.1	325.1	325.9	0.8
T	9,796	176	422	0.5	325.1	325.1	326.1	1.0
U	10,521	119	139	1.4	325.1	325.1	326.1	1.0
V	10,806	136	541	0.4	325.1	325.1	326.1	1.0
W	11,456	62	204	1.0	325.1	325.1	326.1	1.0

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

WEST FORK ISSAQUAH CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Holder Creek								
A	470	79	122	6.6	403.6	403.6	403.6	0.0
B	1,830	40	130	6.2	424.7	424.7	424.8	0.1
C	2,625	20	84	9.6	437.7	437.7	438.4	0.7
D	3,460	30	119	6.7	453.0	453.0	453.7	0.7
E	4,735	23	82	9.8	476.4	476.4	476.6	0.2
F	4,830	42	133	6.0	478.4	478.4	479.3	0.9
G	4,900	38	145	5,5	480.1	480.1	480.1	0.0
H	4,935	29	83	9.7	480.6	480.6	480.8	0.2
I	5,500	19	86	9.3	493.5	493.5	494.3	0.8

[1]Mile Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

HOLDER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
Tibbetts Creek								
A	0.15	N/A	N/A	N/A	32.1	32.1	N/A	N/A
B	0.29	23	88	5.4	32.6	32.6	33.6	1.0
C	0.51	29	128	3.3	39.5	39.5	39.6	0.1
D	0.62	44	124	3.3	43.3	43.3	43.6	0.3
E	0.73	21	81	6.5	46.0	46.0	47.0	1.0
F	0.85	25	98	4.4	50.4	50.4	50.4	0.0
G	0.94	13	43	9.7	53.9	53.9	53.9	0.0
H	1.05	31	96	3.7	59.8	59.8	60.4	0.6
I	1.07	44	113	3.8	59.9	59.9	60.5	0.6
J	1.17	39	98	4.3	63.1	63.1	63.1	0.0
K	1.27	11	39	10.9	69.0	69.0	69.0	0.0
L	1.34	27	174	1.9	77.7	77.7	77.7	0.0
M	1.42	36	155	2.1	77.8	77.8	77.9	0.1
N	1.44	17	88	3.7	78.0	78.0	78.1	0.1
O	1.55	30	46	7.1	85.2	85.2	85.2	0.0
P	1.66	85	91	3.6	95.3	95.3	95.3	0.0
Q	1.62	24	46	7.1	103.2	103.2	103.6	0.4
R	1.65	19	77	4.2	110.7	110.7	110.9	0.2
S	1.68	13	65	5.0	113.2	113.2	113.8	0.6
T	1.71	39	201	1.6	113.5	113.5	114.5	1.0
U	1.77	11	30	10.8	117.6	117.6	117.9	0.3
V	1.82	64	51	6.4	124.4	124.4	124.4	0.0
W	1.85	12	32	10.1	127.0	127.2	127.2	0.2
X	1.91	16	74	4.4	134.6	134.6	134.8	0.2
Y	1.97	28	44	7.4	137.5	137.5	137.6	0.1
Z	2.01	18	40	8.2	142.9	142.9	142.9	0.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

TIBBETTS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Tibbetts Creek (Cont'd)								
AA	2.06	38	48	6.7	148.7	148.7	148.8	0.1
AB	2.11	31	39	8.4	157.0	157.0	157.0	0.0
AC	2.16	7	55	5.9	175.8	175.8	175.8	0.0
AD	2.18	22	111	2.9	176.2	176.2	176.4	0.2
AE	2.21	8	53	6.1	182.5	182.5	182.8	0.3
AF	2.22	24	61	5.4	182.5	182.5	183.1	0.6
AG	2.26	160	30	10.9	187.3	187.3	187.4	0.1

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

TIBBETTS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
May Creek								
A	0.14	34	158	5.5	21.0	21.0	21.5	0.5
B	0.16	60	239	3.6	21.8	21.8	22.2	0.4
C	0.24	42	99	8.8	23.3	23.3	23.3	0.0
D	0.25	42	110	7.9	25.7	25.7	25.7	0.0
E	0.31	31	121	7.2	29.0	29.0	29.2	0.2
F	0.39	40	150	5.8	32.5	32.5	33.0	0.5
G	0.46	28	87	10.0	35.8	35.8	35.8	0.0
H	0.52	23	123	7.1	40.0	40.0	40.6	0.6
I	0.57	45	165	5.3	41.8	41.8	42.5	0.7
J	0.63	31	89	9.7	45.3	45.3	45.3	0.0
K	0.78	33	133	6.5	55.2	55.2	55.2	0.0
L	0.94	79	143	5.1	64.7	64.7	64.7	0.0
M	1.09	33	113	7.7	76.4	76.4	76.6	0.2
N	1.25	39	128	6.6	85.4	85.4	85.4	0.0
O	1.36	32	89	9.6	93.1	93.1	93.2	0.1
P	1.39	40	172	4.9	95.6	95.6	96.0	0.4
Q	1.41	33	90	9.5	95.8	95.8	95.8	0.0
R	1.42	33	111	7.7	96.4	96.4	96.4	0.0
S	1.46	30	95	8.9	99.8	99.8	99.9	0.1
T	1.54	22	91	9.3	106.8	106.8	106.9	0.1
U	1.56	8	68	12.5	112.2	112.2	112.2	0.0
V	1.61	43	283	2.9	114.2	114.2	115.1	0.9
W	1.74	27	81	9.9	120.9	120.9	120.9	0.0
X	1.83	38	170	4.8	125.0	125.0	125.7	0.7
Y	1.96	52	101	8.0	135.8	135.8	135.8	0.0
Z	2.02	42	130	6.3	140.4	140.4	140.5	0.1

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MAY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	ELEVATION	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
May Creek (Cont'd)								
AA	3.23	37	124	5.1	266.4	266.4	267.3	0.9
AB	3.34	33	78	8.2	278.3	278.3	278.3	0.0
AC	3.49	41	135	4.7	289.6	289.6	290.2	0.6
AD	3.68	40	134	4.8	300.3	300.3	300.3	0.0
AE	3.74	15	78	8.2	304.3	304.3	304.5	0.2
AF	3.80	21	80	8.0	306.5	306.5	306.9	0.4
AG	3.90	18	105	5.3	309.2	309.2	310.0	0.8
AH	3.99	53	257	2.2	310.0	310.0	310.7	0.7
AI	4.07	19	92	5.5	310.2	310.2	311.1	0.9
AJ	4.13	92	371	1.4	311.5	311.5	312.1	0.6
AK	4.22	75	303	1.7	311.5	311.5	312.3	0.8
AL	4.37	241	983	0.5	311.8	311.8	312.8	1.0
AM	4.48	96	387	1.3	311.9	311.9	312.9	1.0
AN	4.58	137	540	0.9	312.1	312.1	313.1	1.0
AO	4.68	19	78	6.5	312.5	312.5	313.1	0.6
AP	4.90	133	559	0.9	313.4	313.4	314.4	1.0
AQ	5.12	115	325	1.6	313.8	313.8	314.8	1.0
AR	5.30	44	220	4.2	315.5	315.5	316.0	0.5
AS	5.47	12	57	6.5	319.2	319.2	319.2	0.0
AT	5.56	73	413	0.9	320.3	320.3	321.1	0.8
AU	5.72	85	444	0.8	320.3	320.3	321.2	0.9
AV	5.86	184	743	0.5	320.4	320.4	321.4	1.0
AW	6.00	216	491	0.8	320.4	320.4	321.4	1.0
AX	6.16	50	70	5.3	321.9	321.9	322.2	0.3
AY	6.29	100	271	1.4	323.2	323.2	324.2	1.0
AZ	6.44	170	324	1.1	324.0	324.0	324.8	0.8

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MAY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
May Creek (Cont'd)								
BA	6.56	13	40	6.0	324.3	324.3	325.3	1.0
BB	6.65	138	106	2.3	329.5	329.5	329.5	0.0
BC	6.70	11	26	4.3	330.8	330.8	331.4	0.6
BD	6.78	34	58	1.9	332.0	332.0	332.8	0.8
BE	6.93	61	48	2.3	334.1	334.1	335.1	1.0
BF	7.10	33	37	2.9	338.1	338.1	338.8	0.7
BG	7.24	11	26	4.2	341.9	341.9	342.7	0.8

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MAY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT[2] FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
May Creek Tributary								
A	700	61	127	1.1	329.5	328.0	329.0	1.0
B	1,100	78	198	0.7	329.5	328.1	329.1	1.0
C	1,600	69	151	0.3	329.5	328.2	329.2	1.0
D	1,950	45	92	0.5	329.5	328.2	329.2	1.0
E	2,420	51	96	0.5	329.5	328.3	329.3	1.0
F	2,760	13	22	2.1	329.5	328.5	329.4	0.9

[1]Feet Above Mouth
[2]Elevations Computed Without Consideration of Backwater from May Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MAY CREEK TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT[2] FLOODWAY	WITH[2] FLOODWAY	INCREASE
					(FEET NGVD)			
Cedar River								
A	0.01	156	916	9.3	15.0	14.6	14.6	0.0
B	0.17	148	856	10.0	16.7	16.7	16.7	0.0
C	0.31	159	1,112	7.7	18.8	18.8	18.8	0.0
D	0.48	141	941	9.1	19.9	19.9	20.0	0.1
E	0.64	131	948	9.0	21.5	21.5	21.6	0.1
F	0.74	167	1,139	7.5	22.8	22.8	22.8	0.0
G	0.78	135	1,247	6.8	24.8	24.8	24.8	0.0
H	0.88	132	1,122	7.6	25.2	25.2	25.2	0.0
I	0.99	133	1,042	8.2	25.7	25.7	25.8	0.1
J	1.07	152	1,098	7.8	26.4	26.4	26.5	0.1
K	1.14	137	1,103	7.7	27.1	27.1	28.0	0.9
L	1.23	135	1,033	8.3	27.9	27.9	28.6	0.7
M	1.27	127	1,061	8.0	28.5	28.5	29.4	0.9
N	1.31	124	1,135	7.5	29.2	29.2	29.9	0.7
O	1.35	141	1,081	7.9	29.4	29.4	30.0	0.6
P	1.42	128	997	8.6	29.8	29.8	30.3	0.5
Q	1.45	129	849	10.0	30.0	30.0	30.5	0.5
R	1.49	136	1,051	8.1	31.3	31.3	31.5	0.2
S	1.53	126	1,046	8.2	31.6	31.6	32.6	1.0
T	1.59	122	1,058	8.1	32.3	32.3	33.0	0.7
U	1.61	105	982	8.7	32.5	32.5	33.5	1.0
V	1.63	161	1,387	6.2	33.6	33.6	34.3	0.7
W	1.67	160	1,337	6.4	34.0	34.0	34.6	0.6
X	1.79	114	1,057	8.1	35.3	35.3	35.7	0.4
Y	1.94	137	1,222	7.0	38.0	38.0	38.1	0.1
Z	2.11	98	1,031	8.3	40.3	40.3	40.4	0.1

[1]Miles Above Mouth
[2]Elevations Computed Without Consideration of Backwater from Lake Washington

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

CEDAR RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Cedar River (Cont'd)								
AA	2.16	103	1,160	8.5	40.7	40.7	40.7	0.0
AB	2.32	110	1,490	6.6	43.4	43.4	43.4	0.0
AC	2.47	142	1,500	6.5	45.2	45.2	45.2	0.0
AD	2.73	141	1,210	8.1	49.5	49.5	49.5	0.0
AE	2.90	130	1,310	7.5	52.6	52.6	52.6	0.0
AF	2.96	140	1,220	8.1	53.6	53.6	53.6	0.0
AG	3.02	150	1,070	9.1	55.4	55.4	55.4	0.0
AH	3.25	210	1,690	5.8	60.9	60.9	61.0	0.1
AI	3.37	196	1,310	7.5	62.8	62.8	62.9	0.1
AJ	3.58	288	1,685	4.0	67.3	67.3	67.6	0.3
AK	3.84	252	1,535	4.3	70.9	70.9	71.2	0.3
AL	4.03	210	990	9.9	75.0	75.0	75.1	0.1
AM	4.23	169	1,155	6.1	78.8	78.8	78.8	0.0
AN	4.39	349	1,869	3.5	81.6	81.6	81.7	0.1
AO	4.63	400	2,535	3.9	83.7	83.7	83.8	0.1
AP	4.77	279	1,257	5.8	87.2	87.2	87.3	0.1
AQ	4.88	410	1,358	4.5	90.5	90.5	90.7	0.2
AR	5.20	700	1,693	4.1	96.9	96.9	97.0	0.1
AS	5.34	328	1,978	3.4	99.0	99.0	99.3	0.3
AT	5.53	298	1,208	5.1	103.3	103.3	103.6	0.3
AU	5.72	355	1,330	4.7	107.6	107.6	108.5	0.9
AV	5.96	280	2,038	2.9	111.8	111.8	112.7	0.9
AW	6.09	300	2,134	4.6	114.1	114.1	114.5	0.4
AX	6.30	188	1,140	5.8	118.2	118.2	118.3	0.1
AY	6.46	221	1,934	3.2	123.0	123.0	123.2	0.2
AZ	6.63	325	1,489	4.5	126.9	126.9	127.1	0.2

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

CEDAR RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
Cedar River (Cont'd)								
BA	6.83	322	1,375	3.5	130.7	130.7	131.0	0.3
BB	6.98	200	1,325	7.4	134.5	134.5	134.8	0.3
BC	7.12	218	935	6.3	139.1	139.1	139.2	0.1
BD	7.25	240	1,943	3.0	143.7	143.7	143.8	0.1
BE	7.44	500	1,462	4.2	146.1	146.1	146.4	0.3
BF	7.66	290	940	5.2	149.9	149.9	150.1	0.2
BG	7.87	400	921	4.5	155.3	155.3	155.3	0.0
BH	8.07	300	972	5.3	160.8	160.8	161.0	0.2
BI	8.18	280	1,056	6.3	164.0	164.0	164.0	0.0
BJ	8.32	418	1,489	3.1	168.0	168.0	168.3	0.3
BK	8.52	518	1,674	5.1	171.9	171.9	172.5	0.6
BL	8.74	305	902	6.7	177.5	177.5	178.0	0.5
BM	8.97	229	1,746	3.2	183.6	183.6	183.6	0.0
BN	9.20	170	1,089	8.9	186.7	186.7	186.7	0.0
BO	9.39	211	1,440	4.7	191.4	191.4	191.6	0.2
BP	9.52	315	1,155	6.7	193.6	193.6	193.8	0.2
BQ	9.65	280	1,443	4.0	196.4	196.4	196.9	0.5
BR	9.75	195	1,442	3.8	198.4	198.4	198.7	0.3
BS	10.05	310	1,441	4.3	203.3	203.3	203.7	0.4
BT	10.27	400	1,911	4.0	206.8	206.8	207.8	1.0
BU	10.43	350	1,251	5.4	209.7	209.7	210.7	1.0
BV	10.62	800	3,294	2.6	216.7	216.7	216.9	0.2
BW	10.75	600	2,297	4.1	218.0	218.0	218.6	0.6
BX	10.90	500	1,379	4.7	220.8	220.8	221.3	0.5
BY	11.06	314	1,521	3.3	224.4	224.4	224.8	0.4
BZ	11.10	202	1,386	7.3	225.7	225.7	226.0	0.3

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

CEDAR RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
Cedar River (Cont'd)								
CA	11.17	248	1,544	3.2	229.2	229.2	229.2	0.0
CB	11.38	300	1,546	4.3	232.7	232.7	232.8	0.1
CC	11.66	180	1,385	2.9	234.9	234.9	235.1	0.2
CD	11.78	160	878	11.0	237.7	237.7	237.8	0.1
CE	11.97	280	1,602	2.9	245.0	245.0	245.0	0.0
CF	12.13	390	1,741	2.5	247.0	247.0	247.1	0.1
CG	12.34	500	1,593	4.5	250.9	250.9	251.2	0.3
CH	12.52	480	1,490	3.6	256.3	256.3	256.7	0.4
CI	12.59	500	1,108	8.8	258.8	258.8	259.0	0.2
CJ	12.83	210	1,094	5.2	266.0	266.0	266.0	0.0
CK	13.05	520	2,123	2.9	270.9	270.9	271.1	0.2
CL	13.41	600	3,201	2.0	284.4	284.4	284.4	0.0
CM	13.83	800	1,807	3.5	291.0	291.0	291.1	0.1
CN	14.18	500	2,009	3.2	301.3	301.3	301.4	0.1
CO	14.61	150	1,259	4.1	313.6	313.6	313.7	0.1
CP	15.78	320	1,406	4.5	346.9	346.9	347.2	0.3
CQ	15.95	140	951	4.1	351.1	351.1	351.2	0.1
CR	16.46	410	1,302	4.4	363.7	363.7	364.0	0.3
CS	16.62	240	1,082	4.4	368.5	368.5	368.7	0.2
CT	16.73	222	1,525	4.0	372.6	372.6	372.9	0.3
CU	16.89	180	1,294	7.3	376.3	376.3	376.7	0.4
CV	17.05	240	894	6.9	380.9	380.9	381.2	0.3
CW	17.22	360	2,050	2.1	387.1	387.1	387.9	0.8
CX	17.68	250	740	8.3	401.3	401.3	401.7	0.4
CY	17.93	200	1,201	7.9	411.0	411.0	412.0	1.0
CZ	18.90	160	1,026	5.8	447.3	447.3	447.7	0.4

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA

AND INCORPORATED AREAS

FLOODWAY DATA

CEDAR RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Cedar River (Cont'd)								
DA	19.10	150	980	9.7	453.4	453.4	453.5	0.1
DB	19.30	180	1,020	9.3	460.2	460.2	460.2	0.0
DC	19.60	200	910	6.1	472.2	472.2	472.4	0.2
DD	20.01	230	1,317	7.2	484.7	484.7	485.0	0.3
DE	20.24	250	851	7.0	491.3	491.3	491.3	0.0
DF	20.24	250	1,005	9.4	499.2	499.2	499.3	0.1
DG	20.81	200	782	12.1	512.2	512.2	512.2	0.0
DH	21.10	200	1,175	8.1	522.8	522.8	522.8	0.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

CEDAR RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY[2]	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Thornton Creek								
A	327	22	76	5.1	15.5	15.5	15.5	0.0
B	860	31	109	3.6	20.0	20.0	20.1	0.1
C	1,046	13	63	5.3	20.5	20.5	20.6	0.1
D	1,295	43	158	2.1	22.7	22.7	22.9	0.2
E	1,410	46	167	2.0	22.8	22.8	23.0	0.2
F	1,745	24	186	1.8	31.0	31.0	31.0	0.0
G	1,960	28	86	1.8	31.0	31.0	31.0	0.0
H	2,090	17	143	2.3	32.7	32.7	32.7	0.0
I	2,460	17	118	2.8	32.7	32.7	32.7	0.0
J	2,778	43	172	1.8	32.8	32.8	33.0	0.2
K	2,860	41	159	2.0	32.8	32.8	33.0	0.2
L	3,395	18	67	4.7	33.7	33.7	33.8	0.1
M	3,850	15	73	4.2	35.0	35.0	35.2	0.2
N	4,170	34	99	2.9	35.5	35.5	35.8	0.3
O	4,990	21	48	6.0	37.7	37.7	37.7	0.0
P	5,275	16	44	6.5	39.9	39.9	39.9	0.0
Q	5,488	22	72	4.1	40.9	40.9	41.8	0.9
R	5,606	18	73	3.6	41.7	41.7	42.5	0.8
S	5,888	28	82	3.2	43.1	43.1	43.6	0.5
T	6,046	20	68	3.8	43.6	43.6	44.0	0.4
U	6,460	16	68	3.7	44.3	44.3	44.6	0.3
V	6,570	63	404	0.6	47.3	47.3	47.3	0.0
W	6,800	35	178	3.3	47.3	47.3	47.3	0.0
X	7,155	31	143	4.1	49.7	49.7	49.9	0.2

[1]Feet Above Mouth

[2]Elevation Computed Without Consideration of Backwater Effects From Lake Washington

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

THORNTON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NAVD)			
North Fork Thornton Creek								
Y	7,470	12	33	9.7	51.0	51.0	51.0	0.0
Z	7,801	15	36	8.8	55.7	55.7	55.7	0.0
AA	8,020	14	48	6.7	58.6	58.6	58.6	0.0
AB	8,550	16	40	7.0	63.1	63.1	63.1	0.0
AC	9,271	6	18	10.2	84.6	84.6	84.6	0.0
AD	9,406	14	59	3.0	89.7	89.7	89.7	0.0
AE	9,635	15	25	7.3	94.1	94.1	94.1	0.0
AF	9,840	24	37	4.8	96.3	96.3	96.4	0.1
AG	10,550	15	24	7.4	107.7	107.7	107.7	0.0
AH	11,328	5	17	10.5	127.9	127.9	127.9	0.0
AI	11,690	16	25	7.2	133.2	133.2	133.2	0.0
AJ	12,345	13	24	7.6	144.4	144.4	144.4	0.0
AK	13,035	4	16	11.1	163.2	163.2	163.2	0.0
AL	13,200	17	66	2.7	166.3	166.3	166.3	0.0
AM	13,672	4	14	10.7	172.6	172.6	172.6	0.0
AN	13,836	21	60	2.5	178.0	178.0	178.0	0.0
AO	14,570	24	25	5.9	187.5	187.5	187.5	0.0
AP	15,560	22	25	6.1	203.2	203.2	203.2	0.0
AQ	15,953	7	16	9.1	213.1	213.1	213.1	0.0
AR	16,095	11	27	5.5	216.8	216.8	216.8	0.0
AS	16,750	10	19	7.8	228.6	228.6	228.6	0.0
AT	17,190	7	14	7.9	233.9	233.9	233.9	0.0
AU	17,395	13	29	3.8	236.6	236.6	236.6	0.0
AV	17,555	10	21	5.4	237.1	237.1	237.1	0.0
AW	17,884	8	18	6.0	239.7	239.7	239.8	0.1
AX	18,045	40	70	1.6	241.1	241.1	241.2	0.1
AY	19,003	7	10	11.6	248.1	248.1	248.1	0.0
AZ	19,204	60	219	0.5	254.0	254.0	254.0	0.0

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

NORTH FORK THORNTON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
South Fork Thornton Creek								
A	247	33	108	2.5	54.0	54.0	54.0	0.0
B	872	17	33	8.1	57.5	57.5	57.5	0.0
C	1,515	15	30	9.0	63.1	63.1	63.1	0.0
D	1,705	14	53	5.1	68.7	68.7	68.7	0.0
E	1,848	12	29	8.5	68.9	68.9	68.9	0.0
F	2,551	11	28	8.9	79.5	79.5	79.5	0.0
G	2,696	12	33	7.5	83.0	83.0	83.0	0.0
H	3,350	18	32	7.6	94.0	94.0	94.0	0.0
I	3,800	16	30	7.9	101.7	101.7	101.7	0.0
J	4,140	28	36	6.6	110.1	110.1	110.1	0.0
K	4,318	5	20	11.4	120.0	120.0	120.0	0.0
L	4,630	25	49	4.3	125.0	125.0	125.0	0.0
M	5,155	45	40	5.3	134.7	134.7	134.7	0.0
N	5,814	10	33	4.8	147.5	147.5	147.5	0.0
O	6,555	29	30	5.3	156.5	156.5	156.5	0.0
P	7,035	13	28	5.6	162.1	162.1	162.2	0.1
Q	7,520	13	21	7.2	169.7	169.7	169.7	0.0
R	7,788	9	15	9.7	183.1	183.1	183.1	0.0
S	8,035	19	24	6.4	191.6	191.6	191.6	0.0
T	9,359	6	16	9.3	221.4	221.4	221.4	0.0
U	9,600	49	47	3.2	224.1	224.1	224.1	0.0
V	9,915	10	19	7.9	227.9	227.9	227.9	0.0
W	10,274	17	40	3.8	230.1	230.1	230.1	0.0
X	10,457	12	49	1.8	232.7	232.7	232.8	0.1
Y	10,557	5	15	6.0	233.2	233.2	233.2	0.0
Z	10,890	10	16	5.5	236.2	236.2	236.2	0.0
AA	11,295	6	11	8.0	242.2	242.2	242.2	0.0

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH FORK THORNTON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Forbes Creek								
A	0.27	87	170	1.3	19.8	19.8	20.3	0.5
B	0.31	100	191	1.1	20.5	20.5	21.2	0.7
C	0.49	55	88	2.1	27.6	27.6	28.2	0.6
D	0.63	52	70	2.1	36.2	36.2	36.5	0.3
E	0.73	57	102	1.5	37.8	37.8	38.0	0.2
F	0.86	59	36	4.2	42.4	42.4	42.4	0.0
G	0.92	100	56	2.0	48.1	48.1	48.5	0.4
H	0.93	60	109	1.0	48.2	48.6	48.6	0.4
I	1.05	14	19	5.7	53.4	53.4	53.4	0.0
J	1.15	15	22	5.0	69.4	69.4	69.8	0.4
K	1.18	20	56	2.0	78.5	78.5	78.8	0.3
L	1.22	18	56	2.0	85.5	85.5	85.5	0.0
M	1.34	16	18	6.2	104.4	104.4	104.4	0.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

FORBES CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
South Fork Skykomish River								
A	65.40	481	5,300	8.1	923.6	923.6	924.6	1.0
B	65.48	256	3,329	12.9	923.9	923.9	924.7	0.8
C	65.56	237	3,016	14.3	925.0	925.0	926.0	1.0
D	65.59	238	3,102	13.9	926.4	926.4	926.9	0.5
E	65.61	202	2,838	15.2	926.6	926.6	927.0	0.4
F	65.63	183	3,127	13.8	927.9	927.9	928.1	0.2
G	65.68	430	5,068	8.5	930.6	930.6	930.7	0.1
H	65.83	231	2,470	17.4	931.6	931.6	931.6	0.0
I	65.95	271	3,913	11.0	937.7	937.7	938.7	1.0

[1]Miles Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH FORK SKYKOMISH RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Maloney Creek								
A	100	27	197	5.7	921.3	916.1[2]	917.1[2]	1.0
B	175	55	270	4.2	921.3	916.8[2]	917.8[2]	1.0
C	240	28	178	6.3	921.3	917.5[2]	918.0[2]	0.5
D	550	64	257	4.4	921.3	918.2[2]	919.0[2]	0.8
E	885	29	126	9.0	921.3	919.3[2]	920.2[2]	0.9
F	990	58	208	5.4	921.5	921.5	921.5	0.0
G	1,440	98	324	3.5	922.7	922.7	923.5	0.8

[1]Feet Above Mouth

[2]Elevation Computed Without Consideration of Backwater Effects From South Fork Skykomish River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MALONEY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Miller Creek								
A	760	296	438	4.1	7.1[3]	7.1[3]	7.2	0.1
B	1,090	309	737	2.4	9.6	9.6	10.4	0.8
C	1,370	57	248	2.9	10.4	10.4	11.4	1.0
D	1,560	26	97	7.4	11.2	11.2	11.7	0.5
E	1,720	68	212	3.4	12.6	12.6	13.1	0.5
F	1,960	60	191	8.2	15.9	15.9	15.9	0.0
G	2,040	70	258	6.1	17.0	17.0	17.8	0.8
H	2,280	70	411	3.8	19.1	19.1	19.9	0.8
I	2,650	83	332	4.7	21.2	21.2	21.9	0.7
J	2,940	38	221	7.0	23.3	23.3	24.2	0.9
K	3,240	36	197	7.9	25.5	25.5	26.4	0.9
L	3,650	27	126	12.4	34.9	34.9	34.9	0.0
M	3,900	34	194	8.0	40.2	40.2	40.2	0.0
N	4,180	63	182	8.5	45.9	45.9	45.9	0.0
O	4,390	38	343	4.5	47.4	47.4	48.1	0.7
P	4,540	34	235	6.6	47.4	47.4	48.2	0.8

[1]Feet Above Mouth

[2]Because of Map Scale Limitations, All Floodway Widths Less Than 30 Feet Are Shown As 30 Feet

[3]Water Surface Elevations Without Considering Puget Sound Backwater

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

MILLER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Walker Creek								
A	290	132	217	5.0	11.0	11.0	11.4	0.4
B	510	134	482	2.2	12.2	12.2	13.1	0.9
C	710	254	809	1.3	12.6	12.6	13.4	0.8
D	920	35	98	4.7	12.9	12.9	13.6	0.7
E	1,100	34	106	4.3	14.2	14.2	14.7	0.5
F	1,160	7	35	9.0	16.1	16.1	17.1	1.0
G	1,200	20	97	3.2	16.3	16.3	17.3	1.0
H	1,410	20	49	5.8	17.1	17.1	18.0	0.9
I	1,600	20	37	7.7	21.9	21.9	22.0	0.1
J	1,720	15	50	5.7	23.7	23.7	24.6	0.9

[1]Feet Above Mouth

[2]Because of Map Scale Limitations, All Floodway Widths Less Than 30 Feet Are Shown As 30 Feet

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

WALKER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Longfellow Creek								
A	11,210	9	84	4.5	116.9	116.9	116.9	0.0
B	11,360	31	197	1.9	117.2	117.2	117.3	0.1
C	11,650	18	71	5.3	117.2	117.2	117.3	0.1
D	12,150	54	145	2.6	118.8	118.8	119.8	1.0
E	12,380	15	64	5.4	122.2	122.2	123.1	0.9
F	12,650	12	54	6.5	123.5	123.5	124.4	0.9
G	12,810	13	59	5.3	124.4	124.4	125.4	1.0
H	12,920	14	88	3.5	127.7	127.7	128.7	1.0
I	13,100	11	57	5.4	127.9	127.9	128.9	1.0
J	13,780	12	37	8.4	132.1	132.1	132.6	0.5
K	14,230	19	49	6.3	136.8	136.8	137.8	1.0
L	14,290	12	41	7.6	137.9	137.9	138.1	0.2
M	14,410	39	130	2.4	139.7	139.7	140.6	0.9
N	14,830	13	43	7.2	140.5	140.5	141.2	0.7
O	15,010	41	212	1.4	146.6	146.6	147.6	1.0
P	15,280	48	223	1.3	146.9	146.9	147.8	0.9
Q	15,475	36	126	2.3	148.6	148.6	149.6	1.0
R	16,200	21	57	5.0	151.3	151.3	152.0	0.7
S	16,230	10	50	5.6	152.0	152.0	152.2	0.2
T	16,480	70	308	0.9	158.5	158.5	159.5	1.0
U	16,850	18	38	7.4	159.0	159.0	159.5	0.5
V	17,165	13	46	6.1	165.6	165.6	165.9	0.3
W	17,245	25	78	3.6	166.5	166.5	167.0	0.5
X	19,555	12	20	7.4	226.5	226.5	226.5	0.0
Y	19,835	10	18	7.7	232.5	232.5	232.5	0.0
Z	20,455	35	45	3.1	241.4	241.4	241.4	0.0
AA	21,575	13	23	6.1	253.2	253.2	253.2	0.0

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

LONGFELLOW CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Tolt River								
A	13,850	609	2,877	5.43	141.5	141.5	142.5	1.0
B	16,810	654	1,810	8.54	157.2	157.2	158.2	1.0
C	20,300	699	4,849	3.18	177.2	177.2	178.2	1.0
D	22,740	907	6,277	2.45	194.1	194.1	195.1	1.0
E	26,880	150	1,267	12.06	214.9	214.9	215.9	1.0
F	29,120	165	1,452	10.49	229.8	229.8	230.8	1.0
G	31,620	189	1,404	10.81	249.9	249.9	250.9	1.0
H	34,781	150	1,212	12.45	274.9	274.9	275.9	1.0

[1]Feet Above Mouth

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA
AND INCORPORATED AREAS

FLOODWAY DATA

TOLT RIVER

5.0 INSURANCE APPLICATION

For floodplain insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown are selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheetflow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where the average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot based flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens and symbols, the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The current Flood Insurance Rate Map presents flooding information for the entire geographic area of King County. Previously, separate Flood Insurance Rate Maps were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in the Community Map History data (Table 5).

7.0 OTHER STUDIES

Due to its more detailed hydraulic analyses, this Flood Insurance Study supersedes all previous Flood Insurance Studies/Flood Insurance Rate Maps covering King County and the incorporated areas (References 1 to 18, 90, and 91). The City of Bothell and the Town of Milton have individual effective Flood Insurance Studies. (References 92 and 93, respectively).

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE(S)	FIRM EFFECTIVE DATE	FIRM REVISION DATE(S)
Auburn, City of	May 24, 1974	September 19, 1975 February 18, 1977	June 1, 1981	
Bellevue, City of	August 2, 1974	August 13, 1976	December 1, 1978	February 23, 1982
Black Diamond, City of	July 25, 1975	October 30, 1979	October 30, 1979	--
Carnation, City of	May 31, 1974	March 5, 1976	March 4, 1980	--
Des Moines, City of	June 28, 1974	January 2, 1976	May 15, 1980	November 15, 1985
Duvall, City of	August 20, 1976	--	June 4, 1980	--
Enumclaw, City of	September 29, 1989	--	September 29, 1989	--
Issaquah, City of	February 8, 1974	February 25, 1977	May 1, 1980	--
Kent, City of	June 7, 1974	April 22, 1977	April 1, 1981	--
Kirkland, City of	June 28, 1974	September 12, 1975	June 15, 1981	--
Lake Forest Park, City of	June 28, 1974	February 27, 1976	February 15, 1980	
Normandy Park, City of	June 28, 1974	October 31, 1975	November 2, 1977	August 5, 1980
North Bend, City of	May 17, 1974	May 7, 1976	August 1, 1984	--
Pacific, City of	June 28, 1974	December 26, 1975	December 2, 1980	--
Redmond, City of	March 22, 1974	July 9, 1976	February 1, 1979	January 19, 1982
Renton, City of	June 7, 1974	November 7, 1975	May 5, 1981	--
Seattle, City of	November 22, 1974	July 19, 1977	July 19, 1977	--
Skykomish, Town of	February 14, 1975	--	July 2, 1981	--
Snoqualmie, City of	December 21, 1973	--	July 5, 1984	--
Tukwila, City of	May 24, 1974	September 13, 1977	August 3, 1981	--
Unincorporated Areas	January 17, 1975	--	September 29, 1978	--

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

KING COUNTY, WA AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Federal Regional Center, 130 228th Street, S.W., Bothell, Washington 98021-9796.

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